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ABSTRACT

This preliminary work in human communication for librarians is designed to help the library profession address itself to significant communication problems. As they relate to the library and information sciences, the three major areas of communication science covered are: (1) History and theory of communication and culture, organization and function of communication institutions, and communication structures in biological and social organization; (2) Transfer of meaning, design and processing of messages in different media, analysis of message content and systems; and (3) Individual behavior, social interaction and experience, attitude formation and change, public opinion and collective behavior, and the consequence of exposure to various messages. A listing of 253 references is included. (See also LI 002 783 to LI 002 785.) (Author/MF)

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COMMUNICATION FOR LIBRARIANS

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INTRODUCTION

The general purpose of this preliminary work in human communication for librarians is first to "keep the faith" with such leaders in library communication as Butler, Waples and Berelson, and secondly to raise some additional considerations which have been made necessary by developments in cybernetic theory. In general, communications in library science is concerned with three major areas:

> History and theory of communication and culture; organization and function of communication institutions; and communication structures in biological and social organization.
>
> Transfer of meaning; design and processing of messages in different media; analysis of message content and systems.
>
> Individual behavior, social interaction and experience; attitude formation and change; public opinion and collective behavior; and the consequence of exposure to various messages.

This consideration of communication science is designed to help the library profession address itself to the significance of such problems as the following. How so the disciplines and professions process, transmit and integrate information into given frameworks of knowledge? How do societies produce symbol systems and muster their communication technologies so as to decrease the time lag between knowledge creation and citizen involvement? How are the issues and choices inherent in the sociopolitical and cultural systems assigned value and significance for the ordinary citizen? How are communication policies and message systems to be measured for their role in sociopolitical and cultural change, and indeed for that matter in the changing personalities of an individual? How does a story, a message, a symbol evoke or elicit response, unite or divide, bind or release?

Knowledge is created in the crucible of scientific endeavor, preserved by publishers, stored by library and information science professionals and distributed to those who have an interest in using information. The motivation for this thrust has come from the traditional few in the power structure and the scientific and cultural elite who have stood to profit most from adequate information sources. But the vast majority of citizens have yet to become widely involved with information utilization in order to solve especially the urban problems of our time. Communications librarians are being prepared with an understanding of and ability to help an increasing range of citizens to work with the symbol manipulators in the sociopolitical and economic structure of society.

Data supply is one thing, and the profession of library and information science has helped American society to build a network of information centers that often serves as a model for other countries to emulate; but the significance of that data to the actual problems of people and communities is another matter. Most people in communities are either frightened by the "information explosion" or react to it as another tax supported machiavellian control device which serves the military-industrial complex. A great deal remains to be done in making the knowledge-store kinetic for the concerns and interests of a wide range of citizens. The purpose of communications study is to improve the librarian's understanding for and skills in motivating the widest possible range of citizens towards information utilization and in the application of information to their concerns and interests.

The new social bases of message design and usage have meant a revolution in the exploitation of information and in popular culture. Information has become a social resource to be exploited for the betterment of all men. The institutions of communication have created publics and have cultivated common tastes across boundaries of time, space, status and culture. New patterns of information flow stimulate social development and machine control, and cybernetically shape the referential terms of our negotiations with one another and the real world.

Any change in the process of information stimuli and in the negotiation of mutual intentions alters both the individual personality and the nature of human society. Society is today in the midst of revolutionary transformations. Communications science consequently has had to encounter major change both in technology and in the societal bases of symbol production and use. New media alter form, content and context. New modes of communication change ways of selecting, composing and sharing messages and perspectives. The message and the medium tend to become reciprocal as Marshall McLuhan has dramaticized so remarkably.

The emerging information systems and networks employ communication specialists that exert information leadership in the transformations of sociopolitical and economic institutions which are underway and for revolutionary changes in managerial functions. Organizations, public and private, are being managed less by lawyers and financiers and more by the emerging profession of decision-makers and problems-solvers who can handle large amounts of information about quite different issues and subjects. Such communications specialists move from issue to issue, and indeed from public to private sector, demonstrating competence to focus the immense volume of general and specialized knowledge for organizational decision-making.

In the past, the understandings of sociopolitical and economic life needed by public services and managerial librarians were more frequently learned on the job than in their professional education. With the development of a library communications profession, administrators and public services staff will be trained to better advantage, to attack, not immediate and specific problems peculiar only to one locality, but sets of problems of basic consideration to a wide range of leadership, communications and community applications. Over a period of time, such an approach will eventually bring greater visibility to fundamental and current problems of communications in the library field and create an awareness of, and ability to apply the voluminous literature of research in communications and related fields. Among the many advantages of developing a communications profession for librarians, the following appear to stand out:

1. Provide new impetus in giving library public services explicit form as a major professional area based upon concepts and ideas, or models from the discipline of library communications.

2. Provide the profession with principles and methods for the development and evaluation of new program ideas and new methods of motivating citizen participation and learning.

3. Focus attention on the need for long range systematic research programs using new methods and techniques of research, as a basis for effective planning in library public services.

4. Develop and validate techniques of investigation which minimize error and maximize yield of information for both research in the laboratory and evaluation of ongoing communications situations.

5. Provide a channel for the exuberant creativity of librarian activists to build a relevant and significant communications profession for librarians.

6. Provide study and practice in a wider range of problem-solving and decision-making knowledges and skills in simulated environmental systems that have axiomatic and real-world referents.

7. Expand the impact of the communications program at the Graduate School of Library and Information Science, University of Pittsburgh, in order to overcome the decades-old problem in the profession of a lack of training in communication skills: interviewing, counseling, message design, content analysis, and audience and community development research.

HUMAN COMMUNICATION FOR LIBRARIANS

Communication science is the essential component of all the public services of all types of libraries and information centers for all age groups and for all interests and concerns. Communication is concerned with people and the way they can be involved to achieve a reaction to information. It studies the flow of information through sources, or the lack of these, and their effect on people in meeting self-defined objectives. Communication does not manipulate people but works to produce situations that have been programmed for communicative activity.

If any area of information does not exist in some recorded form, or if it does not exist at all, communications librarians encourage subject specialists to create new knowledge in areas of particular social and individual concern. In so doing, librarians rise to the purposes which the English librarian, John Dury, had for the profession 300 years ago: to write to specialists and encourage them "to beat out new matters in the sciences."

Communication science is based on an understanding of man in the cognitive, affective and behavioral domains. Any epistemological position is better than none, but in order to understand the literature of communication, which is voluminous, the concept of an adaptive control organism and its mechanical analog, the adaptive control mechanism, is of value.

Such an epistemological position requires more than a superficial acquaintence with the social sciences; and the humanities cannot be neglected. Growing out of the social sciences is the ever-increasing concern for a unified systems theory of communication which includes intrapersonal, interpersonal and the socio-drama models. In addition, the unique roles of the subject disciplines and of the professions, as well as their interrelationships should enrich the synthesis with which the librarian brings to his study of communication science.

The librarian will want to understand both the linear, traditional model of communication and the impact which the ever-increasing importance of cybernetics has had upon communication and the unified study of society. Not the least of his interests will be to distinguish among the functions and relationships of information, knowledge or scholarship, and communication. Both content analysis and audience (or market) research will be included in his professional repetoire.

In particular, the information and library science specialist will understand the relationship of knowledge or information to the role and and function of descriptors and other coding devices. His knowledge of user studies will help to round out his understanding of the epistemological implications of human information processing and that of artifical intelligence and bionics. This understanding will help him develop and evaluate appropriate public services whether for the dyad (counseling), the group, or the community.

The librarian's professional understandings will include not only contemporary considerations, but the historical development of public services in all types of libraries. "Reading" studies will be analyzed for their insight into the communicative process, as well as the sociological research in communication of the Chicago Graduate Library School. Not the least of his interests will be an understanding of communication in the administrative process. Any theory of administrative communication is better than none. But today a theory of a communicative and situations-producing profession is available which provides a richer understanding of an environment programed for learning than the simpler and linear considerations of message design.

Message design cannot be ignored and in particular the effect of administration on the conditions under which most effective learning and communication occur. Message design and content analysis are related to all media whether in print, visual or audio format or in any combination of these. Isomorphic transformations will be studied for cross-media effects as, for example, when a novel becomes a play or a movie. In addition, it is difficult to ignore the common homomorphic transformations of knowledge as for example, when the reference librarian consults compendia in a subject field rather than original sources to meet the needs and interests of users.

An understanding of the listening, viewing and reading skills as well as the liberal learning skills will be valuable in establishing a working information relationship with all types and ages of users. Perhaps most important of all to develop is an answer to the fundamental question: are librarians (not libraries) indispensable in people's lives? What special difference do educated librarians make in people's lives that a well trained clerical or bookseller could not do just as well?

Functions of a Communicative Profession:

In order to obtain an overview of the function of communication in any particular profession, it is necessary to identify the principles of a profession as distinct from a subject discipline.

In general, the disciplines create new knowledge; whereas the professions apply the findings of research to the problems of overcoming disorder and of creating order in the affairs of men. To an extent, the professions serve as watchmen for the disciplines. Alert to the needs of constituents, the professions remind the disciplines of lacunae in knowledge where new research should be undertaken in order to benefit the social life of man. This was pointed out over 300 years ago by John Dury (84), the English librarian.

The subject disciplines employ the scientific method to create new knowledge. There are three essential steps in this process of knowledge generation. New facts are isolated by the "bench" scientist working in each of the subject disciplines. These sets of facts are then related one to another and to the corpus of knowledge by the theoretical or "literature" scientist. The predictive value of the new knowledge is eventually exploited by the mission-oriented research programs for technological applications.

The professions on the other hand go one step further by exploiting the predictive value of new knowledge for social purposes. The professions produce (*) situations so that knowledge can become kinetic (**) in the lives of people (1). The purpose is to reduce disorder (***) and engender order for individuals, groups and communities. Each of the professions has carved out an area of responsibility in which it endeavors to become relevant to people when implementing a particular subset of the societal objectives (****). The social objectives to be served are included by the particular profession in its public statements of social responsibilities or codes of ethics. From these goals the administrative control documents of policies and procedures are developed.

(*) "staged" is perhaps a more appropriate term, being indicative of Duncan's (2) socio-dramatic and socio-metric theory of communication which is important for an understanding of the relation of a profession to society.

(**) "knowledge made kinetic" is one definition of information which correlates rather closely with Shannon's (3) concept of information as having surprise value, or Havighurst's (4) principle of the "teachable moment".

(***) entropy is often used as a synonym for disorder whereas negative entropy (neg-entropy) is used for order.

(****) each society has its own commonly self-determined objectives. For the western democracies, those of Lindeman (6) are commonly used as a referrent point. These include: order, economic security, physical well-being, creative leisure time, ethical standards, intellectual diffusion, free expression, democratic organization, spiritual motivation (117).

The rise and prevalence of the modern professions can be viewed in part as a response to the widespread dilemma in societies of how to transmit both the cultural heritage and the benefits of the "knowledge explosion" in order to avoid the trauma of revolutionary change (5). The professions minister to the needs of men through the constituent elements of a systems approach to communication which enables them to produce situations that will reduce entropy in the affairs of men. The effectiveness of these methods as employed by the professions reduce the time lag between the creation of new knowledge and its application to socio-economic and cultural affairs. In general, the constituent system's elements of any communications-producing profession (1) include the following:

1. Agency or institution resources, factors and significant relationships to other agencies.

2. Reader, client and patron concerns and interests--potential, realized and latent.

3. Social framework--constituents, community realities, situations and conditions.

4. Objectives, social responsibility, goals, and rationale for library service.

5. Methods and procedures of interface with community groups and individuals.

6. Citizen's motivation to participate and to learn--public relations, informal education, information supply and referral center.

Giving explicit attention to communication is a fairly new endeavor in the profession of library and information science. Communication by-passes none of the principles or methods of the library profession. Indeed where bibliographic control and systems of libraries staffed by well educated professional personnel do not exist, library communication remains at the primitive levels of retrieval, readers advisory work, public relations and the cosponsorship of organizational programs. Given training in communications, librarians can take responsibility for creating situations in which communicative activity can occur. The general methods for creating conditions within which knowledge can become kinetic in the lives of people include counseling, group work, and community development. These contexts are brought together in a systems design by administration functioning as a communicative endeavor (66).

Librarianship as a Communicative Profession:

The librarian or information specialist must himself be a liberally educated individual before he can work effectively with other people. To this end, the core curriculum in most library schools has been built on the skills of a liberally educated person in the hope that the librarian will use his professional knowledge to achieve professional purposes in the lives of people. But without the study of communication it is difficult if not impossible to realize this hope. There are four reasons for the importance of having librarians study communication science.

First, librarians are trained to select documents and build library collections but they are not educated in methods of helping people in the composition of message discourse units. They do not understand that people may need assistance in externalizing the language they use intrapersonally even in conversation. For example, the inchoate individual can be assisted in the struggle to escape from his "cornered" world by audiovisual composition. In audiovisual message design such a person is helped to organize the verbally latent elements of perceptual experience into inductive composition(s).

Secondly, librarians are trained to catalog and classify documents, but they are not educated in the methods of helping people think creatively and critically. They do not understand that people need help in modeling for themselves the elements of problem solving (7) as well as the elements of conceptual set construction (8). People need interpersonal support before they become courageous enough to externalize the unique patterns of their own intrapersonal mental activity. Supportive counseling is more effective in helping them think about their visceral needs than the retrieval advice of the librarian (9). Intrinsive self-determination is often the product of having been motivated to participate and to learn (10) (11).

Thirdly, librarians are trained in bibliographic and retrieval "look-up" techniques; but they are not educated in the methods of helping people understand the encounter implications of knowledge. People need help in understanding the single media as well as the cross media encounter with information space. They need interpersonal support while internalizing an ever widening range of retrieval skills of logical patterning (12) as well as of the free association of coordinating terms for specificity. Continuous self learning is facilitated not only by a strong centripetal motivation but also by the centrifugal action of many interests and sources of information surprise (13)(14).

Fourthly, librarians are trained in the techniques of administration and the patterns of operations analysis, but they are not educated in the methods of motivating people to participate and to learn. Men are normally gregarious and their need to play roles is so great that if free avenues of expression are not available in the socio-cultural and political drama they will resort to revolutionary activity in order to work out their sterotypes and fantasies (15). Citizens need ombudsman and advocacy support as they develop and internalize the interactive skills of group sensitivity and productivity (16). Continuous self-learning is facilitated directly as the community becomes a programed learning environment (14).

In short, librarians are adept in the externals of professionalism. They are trained in collection building, the organization of documents and subject indexing. They are prepared to manage library operations (administration) be it in the flow of documents (technical services) or in the flow of retrieval and reading questions (reference and readers advisory work). But librarians must be educated to better advantage for the processes of producing situations within which human learning and communicative activity can occur.

One has only to examine Library Literature (17) as one major professional indexing service to find a complete lack of any descriptors related to the human cognitive, educational and communicative processes. It may be argued that such concepts are imbedded in other indexing terms. However, rather extensive literature searchers have been conducted and so far have turned up little of any thing more educational than training laymen in reference books, nor communicative than the mass propaganda programs of public relations. The general method of creating conditions within which knowledge can become kinetic in the lives of people apparently is not yet a widespread or explicit objective of the library and information science profession.

As a profession, library and information science addresses itself to social objectives and as a system employs those general communication producing methods which will help people implement social objectives. Library and information science however differs from the other professions in that it addresses itself to man himself rather than to some subset of the social objectives. Librarianship, at least in the western domocracies, has promoted primarily the liberal education of all men as the root-solution for the problem of social entropy.

The librarian or information specialist promotes the liberal education of all men by establishing an atmosphere in which change can take place in three contexts: the individual, the group, the community. From a communications point of view several questions can be raised about the effectiveness of the traditional librarian in creating a climate wherein communicative activity can occur. The following questions yield many subquestions when examining library communications:

1. How well are librarians using the models of individual psychology, individual counseling and interpersonal communication in promoting the personal development of the individual?

2. How well are librarians using the models of interpersonal communications, psychodrama, group synamics, and network theory in promoting group services?

3. How well are librarians using the models of community development, mass communication, socio-metrics and socio-drama in order to promote community service?

Counseling Communication:

Counseling is the major method for engendering communicative activity in the individual. By using the methods of counseling, the librarian facilitates those intrapersonal processes in the individual which work to internalize both the concepts imbedded in the language and the values imbedded in behavioral patterns (18). Intrapersonal communication is facilitated by the techniques of audiovisual composition (20). The referrent points respectively are the intrapersonal perceptual experiences and the contraints of peer, reference and social group behavior (19). Dyad interpersonal communication is promoted by the librarian by listening with an information-oriented ear and by hypothesizing about the intrapersonal content of the patron (21).

Intrapersonal communication must be externalized if maturity in reading, viewing and listening is to be achieved by the individual (13). The process of externalization is facilitated in the individual by a combination of the methods of interviewing (22) and the counseling communicative behavior of the librarian. The concepts and values to be identified are determined entirely by the library patron and negotiated only so far as he is willing to pursue them (23).

Basic to an understanding of the library patron as a continuing self-learner is the concept of a human being as a adaptive control organism. This cybernetic concept has been explicated in considerable detail as the basic epistemological position for an understanding of individuals, groups and society (24). The adaptive control organism prossesses a sensing apparatus (five senses) for detecting perceptions, an interpretive apparatus (stored concepts and values) for accessing the implication of information modulations (surprises) and a behavioral apparatus (speech, motor activity) for testing the action implications of the interpreted information. Speech (discourse units) and motor activity (habits, mores) constitute the feedback loop of the cybernetic model of communication (25)(26).

Although implicit in the historical precedents of the profession, counseling communication was first developed explicitly by Maxfield (27) as an area of professional service. Maxfield provided a rationale for counseling service and located the area of responsibility as including the first three levels in the total field of counseling:

1. Source and information identification.

2. Advisory services for individual follow-through.

3. Developmental counseling for empathetic listening and problem identification.

4. Clinical counseling based on extensive psychological testing.

5. Therapeutic counseling for overcoming repressions and psychoses.

The first three of these levels of counseling are consistent with the library profession's service program to individual patrons (28). The work of Taylor (29) and many others (30) have contributed to the flow-chart school of reference or retrieval service (31). There is of course, as Belth (85) has pointed out a clear distinction between reference and readers advisory work. In two other areas, readers advisory or bibliotherapy (32) and training laymen in the use of the library (33)(34), the profession has contributed to an understanding of the function of advisory services.

It has been established in the profession for some time, that communications librarians even though they may specialize in one context cannot ignore the other two communications contexts (37) (38). More specifically, the reasons for this are as follows: Individuals need to be counseled for effective participation in group activity (39). Newer administrative principles stress intrinsic staff evaluative process such as the problem solving interview (40), rather than extrinsic evaluation based on formal rating forms. Finally, individuals who are constantly exposed to the rain of information in mass media programing can profit from having such superficial information contacts deepened by library service to the individual (41).

Group Communication:

Group communication is the major method employed by librarians to engender communicative activity in the context of group processes.

The principles of professional service are to reduce group entropy. These principles have for many years been developed under the rubric of adult education. Two leaders in the profession have conducted research into the professional purposes for adult education. As a result of his historical study (42), Lee has developed a taxonomy of activities (43) which are characteristic of adult education. Monroe (44), on the other hand, had developed a taxonomy of adult education on roles or functions.

The weakness however of these and other approaches to professional adult education is that they are primarily based on a linear model of communication. This model is used to explain all of the library's services including those to the individual, the group and the community. There is nothing particularly wrong with the linear model of communication (45) which goes at least as far back as Aristotle. But it does not explain the dynamic, interactive and developmental processes of human communication (46).

Communication is not something that is done to and for a group. Rather it is a process which the group members do for themselves. In group dynamics (47) and sensitivity training (48), members of the group learn how to avoid non-functional behavior and to play roles which move the group as a whole toward its goals. The group becomes a communicative context in which change behaviors can be planned and carried out. For example, group dynamics techniques have been used in resolving border disputes in emerging countries in Africa (114).

Group network theory has produced patterns of interaction analysis (11) which can be employed to study and improve: the cooperative behavior of individuals (47); the learning environment of the group (49); and administrative processes (50). Some experimentation with group dynamics has taken place in the profession; however, the development has been at the programatic level rather than for theory development and measurement.

Much of the research work has been undertaken in the fields of general adult education or formal education. A clear distinction is made between motivation to participate (51) and motivation to learn (52), and the dichotomy is between extrinsic and intrinsic rewards. For example, the public librarian spends a great deal of energy in motivating citizens to participate in the library's services. The concept of motivation to learn is almost unknown to the public librarian, whereas it is at the core of school librarianship (*).

The analysis of the shortcomings of public library service to children and yough strengthens the argument that public librarians need training in learning psychology and educational methods. If this cannot be provided it may be better to turn over all library service for children and youth to the school library where it more appropriately belongs until excessive type of library service can be eradicated from the profession (53) in favor of information transfer networks (54).

The model of the adaptive control organism (24) is as appropriate to the group context as it is to the field of the individual person. According to the conditions which produce change (57), the group members must be involved in a set of common stimulus experiences provided either by themselves (informal adult learning) or by the catalytic leaders (formal instruction) (**). Once group perceptions have been stimulated, provocative conditions (including cognitive structures and value systems) must be developed so that the members can interpret the information modulation (***). Finally, without the follow-up of an action agenda no group out-put (decision-making) can be fedback for analysis and further development (****).

(*) At least it is theoretically the basis of school librarianship. Even though school library leaders (55) have struggled to improve the field, much of what Roe (56) had to say about its service orientation rather than educational orientation remains characteristic of the profession.

(**) Based as it is on the linear model of communication, most library group programing is realized, for example when a charismatic speaker is scheduled who can keep the audience awake.

(***) This important phase of the group communicative process is preempted by the librarians' so-called discussion groups which are largely opinion massaging sessions.

(****) In library group work, the ubiquitous question period suffices without any human concern for the deep epistemological and intrapersonal movements which may have been set in motion by the communicative experience.

Social Communication:

Community development is the major method for engendering communicative activity in society. The librarian's principles for reducing social entropy have been developed in the methods of community study (62), public relations (63) and library extension where an attempt has been made to decentralize the library collection. Community development has in most instances been limited to preliminaries of communicative activity--survey data compilation. In public relations there has been an emphasis upon transmitting the image of the library agency to a mass and usually passive audience.

In these community endeavors, librarians appear to have been more interested in rivaling the expansionist activities of other institutions and agencies, than in creating conditions for people where communication can occur. The report of the President's Commission on Libraries, Libraries at Large (65), is a valuable source for an appraisal of the library in society today and its limited commitment to human communication. This emphasis on the need for evidence of performance in budgeting and administration is striking.

Powerful voices are questioning the effectiveness of library services, and there is considerable urgency for a more viable social philosophy and programs of library service that demonstrably make a difference in people's lives. Resistence is growing among tax-appropriating and funding bodies--federal, state, local--to sustained let alone increased budgets without more evidence concerning perhaps not the library's worth but its actual communicative performance in the community. Three sources declare library service irrelevant today: from academic circles and the highest levels of governmental authority and funding bodies as a rationale for curtailed budgets; from communities and emerging neighborhood elements as a reason for involving the library in advocacy programs. In the face of such criticism, the profession remains inchoate because no theory of communication is considered to be available and compatable with library objectives.

The model of the adaptive control organism (24) is as appropriate to the analysis of library communication in society as it is for the other communicative contexts (66). Perceptual experience is provided by the stimuli from mass media programing. The prevalence and insistence of the mass media make it difficult to avoid paying attention to at least some of the stimuli programed into the community (41). In order to interpret the implications of the stimuli, the information modulations (surprises) are negotiated through the institutionalized cognitive structures which are provided by libraries and other sources of information as well as through the value systems as provided by the mass media because they can serve a dual function of stimulus and interpretation.

However the mass media do not perform very effectively as interpretor-surrogates for the citizens. When it comes to the question of providing available channels for feedback, the library (*) hardly functions at all. Only the newspapers, and radio in recent years, have made any attempt to serve this significant element in the human communication cycle. Consequently it is not difficult to find a communications explanation to the prevalence of the so-called "disorder of our times". Unless common man has access to the full cycle of the communications process as specified by the concept of an adaptive control organism, he will seek outlets for feedback-needs in revolutionary activity (5).

Community development is the general method of progaming a social order, so that the entire cybernetic cycle of communications can occur. Rural society in America has long had a programatic model in Agricultural Extension (67). A model also exists for societies in transition from rural to urban conditions (68). But a complete model for urban society barely exists even in prototype (**). The works of Klapper (69) and Katz (70) who have studied the effects of communications in society are consistent with the librarians "faith and objectives" identified by Leigh (71) twenty years ago.

The library enjoys a unique place in the institutional structure of any community. As an agency of the people it is non-political, upholds no particular interest and subscribes to complete freedom of communication and education. Consequently, library service can the more readily work with both the power structure and the community for a better domocratic way of life for all. If the library meets its responsibility as a coordinating structure, no interest group, nor power structure will be unduly influential in the community. The general functions and responsibilities of a coordinating structure (i.e. library service) can be listed as follows:

(*) Only in so far as the individual seeks out the library resources in order to deepen a stimulus provided by the mass media does the library serve a feedback function.

(**) Floating Librarians in the Community (16) is the beginning, it is hoped, of a more detailed explication of the elements of a coordinating community structure (72) and the personnel required to effect community communicative coordination.

1. Continuous study of community interests and problems.
2. Survey of existing programs and resources as well as maintenance of resource files.
3. Make the knowledge obtained in the first two functions readily available by disseminating information about these programs, resources, needs and interests of people.
4. Help improve the existing programs of community agencies.
5. Secure out-of-community resources that are needed to understand and meet community needs and interests.
6. Help plan community-wide programs which will make it difficult for people to avoid thinking about solutions to their problems.

Various syntheses of the communications approach to society have appeared in recent years. The work of Kuhn (24) using the model of the adaptive control organism has already been discussed. Thayer (66) and Hall (73) have taken a systems approach to the study of social communications and communications systems. Thayer not only presents a useful survey of trends in communication but also provides a basis for the communicative contexts of intrapersonal (***), interpersonal (****) both dyad and group, and societal. The Silent Language of Hall explicates the general communication systems (*****) which are consistent with the principles of library and information science as presented by Butler (74), Burke (75) and Shera (75)(******).

(***) Birdwhistle (77) and Reusch (78) have considered the non-verbal communication of animals and men respectively.

(****) Barnlund(79) has surveyed both dyad and group interpersonal communication.

(*****) The great societial systems of cultural and scientific scholarship, social policy, and technological developments appear to be analogous to Landheer's (83) social functions of libraries.

(******) The concept of a world encyclopedia appears to have received increased visibility as a result of Shera's work.

Social communications is used to contribute to the feeling of a common life (68). Realization of this objective involves a reciprocal shift in focus of attention from neighborhood and local concerns to community ones, with the consequent tremendous speeding up of information demand and supply. Social communication is the matrix of community planning. Orchestration of the media (72) supply the information, and carry the discussions by which the community arrives at an understanding of the needs of, and the planning for a social concensus.

Social communication is used to teach the necessary skills of community development as well as to communicate widely the agreed-upon goals, the community decisions and the reports of progress. People are prepared to play their roles in a community which together with other communities make up a nation. Prepared for new responsibilities as liberally educated citizens, people are stimulated to exert greater effort and strengthened to endure the setbacks and strains of urban living.

Community development consequently extends the effective market for continuing education. The media are employed in market analysis and program evaluation. All forms and channels of communication are required. Facilities are made available to produce communication materials for the programs which are ready to put them into use. Media utilization includes the extensive and related use of telephones and video-phones, categorized postal mailings, magazines for the local community and especially the informal "talking chains" (70). The mass media provide a matrix for information dissemination by reporting constantly on plans and achievements, on the experiences of others, and on the "heroes" who are to be emulated. Although media create an awareness of new developments, they do not lead to change directly. Actual adoption of new practices requires either personal persuasion or personal example by respected opinion leaders, e.g. the communication librarians (16).

Message Design:

The context of resource materials within which communication can be engendered is that of message design and its corollary intrapersonal communication. Message design is closely related to the intrapersonal communication skills of reading, viewing and listening. Message design is the method for presenting stimuli in recorded format as distinct from the previous three methods of presenting stimuli interpersonally. All four methods for presenting stimuli may of course overlap. But it is helpful to make a distinction between the dynamic and often non-verbal process of interpersonal communication and the more or less linear processes of message recording whether this be in print, audio, visual, or any combination of these. The distinction helps to draw attention to the significance of message design as an essential component in each of the three contexts of interpersonal communication.

Message design is not only linear but it is more highly organized and less dynamic than the cybernetic and situational contexts of dyad, group and community. In this sense, even a lecture is more dynamic than a printed message. However the lecture may or may not be more dynamic than an audiovisual message. The latter is based on the principles of inductive composition which juxtaposes audio and visual stimuli in addition to the conceptual stimuli of verbal communication.

Message design is based on the principles of written composition because these serve the purposes of the sender and are supposed to meet the needs of the receiver. The constraints are those which the language imposes. Since language is the device by which each human being organizes and sustains his personality, so also can message design be used for such purposes. In fact, so prevalent is the practice that the research technique of content analysis (21) is used to probe for the sender's actual intentions.

It cannot be said that recorded messages do not communicate. The influence of the "great books" in western civilization is certainly indicative of their communicative powers. But what may not be evident is that these great documents came at a time when people were widely "prepared" to receive the messages contained in them. This preparedness "happened" to occur, and until recently little thought was given to creating conditions in which widespread communication could take place.

As a result of the "geography" of reading studies (81) done at the Chicago Graduate Library School during the 1930's and 40's, some attention was given the problem. For example, Waples in What Reading Does to People (82) probed into the socio-economic and cultural conditions which could be expected to precondition readers to pay attention to certain types of materials. Today we refer to this method of communication as the "Madison Avenue" technique where the findings of opinion and market research are used to create the conditions within which successful communications campaigns can be launched.

Consequently, message design in the traditional sense of composition is only one element in the total communications process. As is the case in the communicative contexts previously identified, the cybernetic model of communication can be a distinct asset in the analysis and development of message design. It indicates that messages should be created or used (if previously created for other purposes) in context in order to give full display to the communications cycle.

It may be obvious that the channel provides another constraint upon the message. Any message is determined by its channel if indeed they are not synonymous as the current McLuhanism goes, "The medium is the message". What may not be so obvious however, is the fact that audiovisual messages follow an inductive design rather than the traditional deductive conventions. Other than Pryluck (60) few researchers have investigated media composition as the juxtaposition of experiential signs in contrast to verbal composition with its logical organization of symbols.

According to epistemological theory, especially as it has been enriched by cybernetic theory (45), the adaptive control organism (25) feeds upon vast amounts of inductive perceptions before developing much cognitive structure at all (19). The process resembles a concentric and helical mapping of many experiences upon single symbols. Once symbolization has transcended sign occurance, logical thought is possible and messages can be developed based upon deductive composition(45).

Message production may be described in terms of social conditions, or social conditions in terms of message production. Productions may be explained by reference to the social milieu they represent. On the other hand, social characteristics may be explained by reference to the productions in which they can be recognized. Almost any cultural aspect can be related to some aspect of communication. National and regional differences, with all their implications, make for corresponding differences in production. The roles of such diverse cultural forms as language, religion, taboo, fetishes, division of labor, and systems of exchange could be documented.

Even the physical characteristics of message channels are modified to a degree by general social conditions. Social changes are reflected by technical developments in publishing and by specialization within the trade to meet new economic conditions. Current phenomena include the large number of mergers among all types of media producers and publishers, as well as the increased concern among librarians about channel fidelity as is evidenced by the Library Technology Project of the American Library Association.

In a sense then, a society "demands" some publications and media programs from the universe of all conceivable message productions and "rejects" others. Publications and communication programs are not produced in a cultural vacuum. They are produced by media personnel who possess individual and group interests. Such social "demands" are interpreted by the agents of communication--the people directly engaged in message development and production. Their activities are determined by contemporary social forces as well as by their own social status, interests and personalities.

The determining preconditions include obviously the nature of the people as a whole (their loyalties, activities, traditions) and the interests and purposes of the individuals who create, who do the research, and who publish. The nature of society is expressed in publishing in two ways: 1) it provides the themes and message content to be produced; 2) the message designers and producers are so immersed in the culture that they reflect it in whatever they produce. Either of these factors can account for similarities among message productions. On the other hand, the individualities of writers, producers, publishers, and other agents of communication account for many of the differences.

Pressure groups are responsible directly or indirectly for the mass communications media which are the hardest of all to escape. The pressure groups in modern society differ greatly in size, purpose, membership, and in other characteristics. But they all seek to influence people in particular ways. Their competition for public support places a premium upon the skill of manipulating opinion. The manipulation requires several channels of communication. Pressure groups may supply copy to established producers, subsidize friendly producers and publishers, or produce publications of their own in order to bring their proposals to public attention. The influence of such special pleading upon people ranges from clarification of issues to the complete confusion of conflicting claims.

Governments determine communications production both by issuing their own messages and publications and by legally prohibiting others. Government publications range from the how-to-do-it handbook of instructions, to direct or indirect propaganda favoring the parties in control. Governmental censorship may be described either as an "expression of the will of the people" or as a restriction imposed upon the constituency by those in power. In either case it affects the communications productions and the publications that are available. Government also affects communications by supplying news and publicity releases to the media. For example, the United States government issues research findings, statistical reports, news releases, instrumental booklets about everyday problems, and many other sorts of publication. The influence of government on production is more evident during crises, especially in wartime, when the government either controls all media or organizes a propaganda bureau to regulate the flow of news in the national interest.

Context of Administration:

Historically, administration has been devoted to the managing of staff, resources and services more as physical objects than as human entities in a context where communication could occur. Consequently, there has been a considerable emphasis upon the control devices of command structure, job classification and performance rating scales. The chain of command is preferred to the lattice of communication.

It is therefore not surprising that systems analysis (86) and more recently operations research (50) has had a considerable impact upon library administration rather than communication. Obviously, to develop management programs which reduce delay in the delivery of materials to the patron, in controlling the budget and in minimizing costs is a desireable objective. Simulation modeling, heuristic problem solving, and algorithmic definitions may be fancy names for the management function but they do indicate processes of thinking which place the librarians in better control of library routine.

Nevertheless there is one facet of operations research which when implemented soon becomes an "achilles heel". While the needs and interest of patrons seldom if ever fit the neat catagories and steps of PERT programing (88) for example, management procedures developed along these lines soon raise rather serious questions about client understanding and acceptance as well as the limited range of interpersonal problems that can be attacked by operations research. It becomes evident that the problems raised are those of communication and these require analysis in communications research (45).

To examine the library function (89) with the aid of the elements of a situation-producing theory of communication (1) requires a cybernetic theory of communications, as opposed to a linear model (45) in which men and resources are moved about sequentially as checkers in a game. In order to accept such a position, the profession will have to move philosophically from the communication position indicated for it by Shera (90) to a position of social relevance and responsibility envisioned by Stone (91)(*). In general, librarianship has not made this transition even though there are movements towards it by younger members of the profession (16).

The demands which Stone and other leaders have continued to make on the profession sound heretical to many librarians. But it is scarely revolutionary. More than thirty years ago, Waples (82) pointed out that message production (including library service programs) may be described in terms of social conditions, and social conditions in terms of message production. The value of Dickoff's approach (1) is not only that it identifies the general purposes of a profession in contrast to a discipline. Dickoff also considers the functional elements which will enable a profession to create the situations or conditions that will help people reduce disorder in their lives. If these elements are coordinated and promoted by a communicative administration, librarians will rapidly become the communications' agents envisioned by Stone (91).

Aided by communications research (45), administration becomes more than the framework of POSDCORB (**) and more than the hierarchy of control drawn on an organization chart (50). The administrative enterprise develops a characteristic way of behaving. It becomes an adaptive control organism with perceptual input, information interpretation and output effects. The purposes and goals of the agency indicate the range of social stimuli to which it will pay attention. The policies and methods exhibit the scope of interpretation of social stimuli. Services and programs provide feedback to the community on the social stimuli which the library perceived.

(*) In his concluding chapter, Shera rather pointedly indicated that librarians had to wait until patrons demanded services before providing them. Stone on the other hand took the "Madison Avenue" approach to the necessity of actively creating information in the minds of citizens in the community.

(**) POSDCORB: planning, organizing, staffing, directing, coordinating, reporting, budgeting (113).

Administrative communication bears an organic relation to society. It is not separate from the rest of society but reflects the structure and development of society. The scope of communicative activity as well as the communication networks, which determine where information flows and to whom, indicates the valence of information to the community. The content of communication at any particular moment reflects the socio-economic and cultural value patterns. The range of citizen participation (volunteers) (67) in communications programing reveals the democratic philosophy of the library.

Administration and communication are symbiotic elements in society. The more that people are able to participate in the decision-making activities of their communities, the more they feel the need for information and continuing education. As administrative communication begins to function in a cybernetic system there will be a greater awareness of community objectives and of the necessity for a community programed for continuous learning (46).

Communicative administration is the social method for mustering resources in the community and in motivating participation (66). Community development communication is the social method for motivating citizens to educate themselves continuously as liberally educated persons (67). There are few communities without some element of discontent and the strain should be channeled into productive activity (92). A certain amount of discontent is necessary in order to motivate citizens to participate in the communicative enterprise (15). According to cybernetic theory, strain should be relaxed temporarily. This relaxation serves as a reward before discontent is built up again.

Power accrues to the disseminators of information. It is for this reason principally that the public library at least in America was made the responsibility of non-political boards of trustees (71). But this practice has more often been considered as a protection for the librarians than as an unparalled opportunity to undertake widespread programs of social communications. The sooner administration is viewed as a communications process, the sooner it will be possible to develop a systems design for the communicative contexts of dyad, group and community library services.

Library Communication Research:

In surveying the research in library communication, Lester Asheim (93) concluded that content analysis and audience research were the two major methods for the kinds of problems faced by librarians. Content analysis (21) depends upon the materials collection and the organization of information records. Audience research however requires the continual analysis of community concerns and interests (72).

Content analysis of discourse and message units is predicated on the librarian's faith and objectives (94) which in essence may be considered a paraphrase on Hall's conclusion (*) that the published record is culture, and culture is the published record. Content analysis investigates both the sender's intentions and the predispositions of the audience. That content analysis is a significant endeavor is evident from Waples (82) pioneering work. More important however is the need to survey and identify beforehand what is to be programed on the media of communication.

Librarians have used a form of content analysis to build their materials collections but serious questions have been raised as to the validity of selection principles (97). Beazley (98) has hypothized that a random selection from the published record is at least as effective as professional selection. Indeed, when one considers the basic axioms (**) of library science (95) it appears that both materials selection principles and subject heading principles are really readers advisory guidelines rather than methods for building and indexing materials collections.

Librarians have undertaken little productive activity in audience research beyond the geography of reading studies (81). Reference research, for example, has been disappointing (87). Indeed, if it were not for information science (12), it would appear that research in this area was not possible. User studies (30) however have led to an understanding of the role of the retrieval librarian as a catalyst in patron problem-solving and topic categorizing skills (8).

Surveys exist of library services as for example the Smith (101) study of adult education in libraries and the MacDonald (102) survey of services to the underprivileged. The Library-Community Project (62) was in part a demonstration of the effective ways of training librarians for community endeavor which has remained largely unrealized in the profession (103). However, there has been considerable survey research in general adult education (67) which is regularly reported in Adult Education (104).

(*) Actually Hall (73) says that, "Communication is culture, and culture is communication."
(**) These axioms inclued: (1) acquire and organize one copy of everything published; (2) index contents for information access; (3) promote the use of information and materials.

As Stone's compilation (105) indicates, media communication has not been neglected. Current work in media studies is reported in AV Communications Review (106) and the American Educational Research Journal (107). Restrospective research studies are summarized in the Encyclopedia of Educational Research (108). Theoretical papers and research studies in the general field of communication are reported in the Journal of Communication (109).

The problem of library communication research appears to result from a lack of theoretical considerations. The conference "Intellectual Foundations of Library Education" (95) was an attempt to remedy this lacuna. The Encyclopedia of Library and Information Science (110) is a milestone in the field. Library Trends (111) is an excellent example of literature searching in various aspects of library science. Documentation Abstracts (112) is a valuable source for research studies as well as the Annual Review of Information Science (30).

The essential problem in library communication today is that of developing measurement scales that have nominal, ordinal and interval value (35). Only one attempt has so far been made in the profession to deal with the problem of measurement in research design (36). While suggestive, it is unfortunately more exhortative for future development than specific in explicating measurement programs for the communication contexts of individual, group and community services. Librarians have not developed measurement scales which will determine what happens to people as a result of being involved in the situations which they have created wherein communication can occur.

Surveys of course have revealed what librarians do, but not what effect they have on people. Perhaps this is indicative of a lack of communications knowledge or orientation in the profession as well as the lack of historical studies of library service in order to decide from the librarian's viewpoint whether the effect of these services can, or should be evaluated at all. Measurement scales of course are available from the other professions who have studied the effect of their services upon people and can be employed in library communication research.

In order to provide a societal matrix in which learning and controlled research studies can take place, the Program of Research in Library Communication of the Bureau of Urban Library Research in the Graduate School of Library and Information Sciences, University of Pittsburgh, has created a large Library-Community Encounter Simulation (80). The axioms or assumptions, the hypothwhich the simulation has been designed to test, and the taxonomy of communicative methods have been explicated in the Floating Librarians in the Community (16). The general purposes and the rules of encounter for the computerized simulation are developed in the Manual for the Library-Community Encounter Simulation (80).

The simulated encounter environment has been developed as a model of the cybernetic or systems approach to experimental design and to the study of the community. This work at the Program of Research in Library Communication has resulted in the development of theoretical constructs which have been validated in service-oriented taxonomies. These service classes so far appear to be consistent with the literature of the library profession. The following are examples of some measurement scales which have already been employed: interaction analysis of Bales (11); Osgood's semantic differential; various attitude instruments; Blocker's counseling scales (20); counseling interface categories (96); Verner's degree of abstraction taxonomy (58); Woodruff's communication vs. control (61); interaction analysis (49); non-verbal behavior maps (78); problem-solving patterns (7); classification nets (8) (18).

Based upon the systems approach to human communication (45) the taxonomic work which has been developed by various researchers in communication so far appears to be consistent with the general objectives of library service to groups. For example, Verner (58) has developed a matrix of abstraction for classifying communication techniques according to the degree to which they are removed from direct experience with content and involvement. The range of the taxonomy is exhibited, for example, in the polarity which exists between hearing a lecture about, as opposed to the direct involvement in a real-life situation.

In a similar way, communication channels have been arranged into a "cone of experience" (59) as a way of understanding difference in materials and services. The broad base of the cone rests upon direct experience while verbal channels, distributed to the opposite pole, are at the top of the cone. The differences between verbal and non-verbal message design (60) have immediate implications for those librarians who still expect meaning to leap out of the text upon a single linear scan of the words.

The matrices which represent the human developmental process have proved useful in library communication programs servicing a wide range of informal groups from the near inchoate level to the highly educated and vocal. The role functions of a group have been categorized into functional and non-functional behaviors (11). Using them for analysis of administrative communications especially in staff and decision making meetings ia a powerful tool to promote the growth and development of agency personnel. Taken together with interviewing for problem-solving in staff evaluation, interpersonal situations are created among staff members wherein a strong movement towards upward communication is engendered.

Avoiding the limitations of linear communication, Woodruff (61) has developed a continuum of the communicative devices which range from high communication and low control to high control and low communication. High communication devices result in the phenomena of feedback so essential to the systems approach, whereas high control devices are characterized by the linear, propagandistic model of communication. Other scales exist, but the profession in general remains to be convinced that the scales measure the kinds of activity they want to undertake in human communication.

Trends in Library Communications:

Library science has begun to change. It is becomming a communicative profession. No longer do librarians stop short of any behavior that will be an occasion to bring about change in other persons. Public relations and "selling the books" comprise functions that have been turned over to paraprofessionals who can perform them effectively. Librarians realize that the adult is not a large child to be left essentially the same forever after passing over the edge into adulthood (100). Librarians, having examined the various stages of adulthood, the needs and interests which arise as a result of them, are developing insight into the communicative and learning process. Librarians are aware of resources other than books, such as wide community referral which meets the patron's felt need to better advantage than printed materials.

FROM the demand-supply function of librarianship as explicated by Shera (90), TO the leadership role advocated by Stone (91) based on market analysis and audience research.

FROM the response to demand typified by information science (30), TO the catalytic leadership of communication science in creating contexts wherein meaning can be engendered. (45)(115)

FROM a concern for mass communication alone (116), TO an appreciation to various communicative contexts and methods (45).

FROM administration as a linear game of checks and balances (71), TO cybernetic systems analysis and a communicative netowrk of various media and contexts (66)(86)

FROM single types of library functions (71), TO the library function as a learning context for the community (89)(92).

FROM an orientation to the subject and the flow of information, within and among the subject disciplines (83), TO a better appreciation and understanding of the human person and his need to understand his own personal experiences before information needs can be met (19).

FROM an emphasis upon reading skills only (13), TO a better awareness and use of other learning skills such as listening and viewing (34).

FROM the management survey of libraries by type, TO experimental research in library communication (16) (98).

FROM an exclusive use of conversation based on intuition (32), TO the use of interviewing as a disciplined skill in the librarian-patron interface (20). In many cases librarians have strengthened their knowledge of classification and a problem-solving orientation to the retrieval of information, because without these abilities they lack the cognitive structure necessary to demonstrate effective retrieval to patrons (18)(22).

FROM two services (reference and readers advisory) (32), TO the administration of one department of interpersonal communication (22).

FROM a single point of view towards the world (53) (65), TO a pluralistic view of the many systems of values and frames of reference of potential and actual library users (16).

FROM "training" in communication through experience on the job alone (99), TO the need for formal training, both academic and inservice (80).

FROM extrinsic staff evaluation based on forms, administrative routines and institutional patterns (40), TO a better intrapersonal insight and self-evaluation (66) (40).

FROM the use of printed materials only in the library, TO an appreciation and use of many materials and various media (38) (89).

FROM statements of general standards, (64) TO more explicit standards and a "Bill of Rights for Adults" based on the communication needs of potential users (100).

FROM satisfaction with service to individuals only (32), TO awareness of the fact that individuals' needs may be expressed either alone or within a group; and that groups have corporate interests over and above individual interests (47).

FROM emphasis on service to children (65), TO emphasis on service to all ages (53).

FROM a leaning toward recreational reading (90), TO recognition of the reference and informational services (29) (31).

FROM ignoring community problems and sketchy knowledge of the community, TO assuming increasing responsibility in community adult education and systematic study of the library's relationship to the community (72) (92).

FROM library service within the library only and isolated efforts toward community service (90), TO service throughout the community and cooperation with other agencies and groups in promoting educational services (62) (72).

FROM dependence on a limited staff, TO involving more lay citizens in the library's program (67) (92).

DEVELOPMENT OF COMMUNICATION

Communication has had a long history, and understood in the sense of culture it is probably as old as mankind. Greece, Rome and all later civilizations have had organized methods for formal communicative patterns. These patterns (or social methods) have included the public buildings, the drama, the public forum and the collections of literature representing the recorded knowledge of the period (5). Such communication "messages" are much in evidence today. Cities have spread over the face of the earth and there seems to be no ending to the compilation of books, articles and audiovisual programs. In turn, the technology of communication makes it as easy to have voice and image contact with a person on the moon as sitting beside one another in the same room.

Communication has not always been such a complex study. The study of communication began with the study of rhetoric and with the art of speaking and writing effectively. Historically, the establishment of library-like agencies was essential to the development of rhetoric and to the study of logic and epistemology (118). The study of the principles and rules of message composition were formulated by critics in the classical age and remain today as the basic rules for written and spoken message design. College composition courses still emphasize the logical and linear design of written communication to the exclusion of the more inductive audio and visual methods of composition. Even the basic model of communication still is the ubiquitous one proposed by Aristotle and includes the sender, the message and the receiver.

The development of communications historically remained fairly static until the technology of reproduction and transmission was changed. The invention of printing was the first major step. But it was not until the 19th Century when steam and electric power was applied to the printing press that a real revolution in communications technology actually took place. Soon the communication revolution began to have deep sociopolitical implications and this became especially the case with the emergence of electronic technology in the 20th Century (41).

On all levels,-- the sociopolitical, cultural and technologcial, -- the study of communications sciences has become a necessity.

The rapid rise and pervasive influence of the electronic mass media initially helped to promote serious study into the phenomena of communications. Rapidly the communications study of various situations, various contexts and various channels was pursued with all the vigor of intense specialization. Mass communications has considered phenomena in the sociopolitical and cultural situations. Interpersonal communication has explored the dynamics of person to person interface in small groups. Information science has investigated the components which affect transmission through various channels and media. However, basic research interests were rapidly dispersed and intermingled as the fields of indexing and abstracting became preoccupied with the service needs of special interest and secondary research groups.

The sociopolitical effects of mass communication was the first to receive serious study. The work of such pioneers as Berelson and Lasswell, investigating the emergence of mass radio communication after World War I, and mass television communication after World War II, made an initial and significant contribution to an understanding of the role of communication in society. Research in mass communication, employing the methodology and pertinent experimental findings of the traditional social sciences, investigated the who, what, why, when and where of sender, message and receiver. These studies have also been referred to as the "geography" studies of communications (81) after Wilson and especially Waples early work in the geography of reading (82), and are related to the role of the communications librarians in community development (62).

During the second quarter of the 20th Century, a concern for interpersonal commuications emerged based on such social science disciplines as psychology, social psycholocy, anthropology, psychiatry, counseling and education. The work of pioneers such as Rogers, Reik, Bales, and Birdwhistle, made an initial and significant contribution to an understanding of the role of communication in the dyad and small social group situation. A convenient summary of the work in interpersonal communications and the contributions of various disciplines may be obtained from Barnlund's Interpersonal Communications (79). It is only recently that serious effort has been made to relate interpersonal communications to aspects of the library and information sciences (20) (   ).

With the emergence of radar and electronic computing devices in World War II, the phenomena of channel and media received serious attention. The work of such pioneers as Wiener, Von Neumann, and Shannon made a significant contribution to an understanding of the complications and complexities involved in signal transmission, channel capacity and coding transformations. Information theory however has remained important in engineering studies, particularly electrical transmission, but has not realized the hopes Weaver (3) had for it in the sociopolitical and cultural aspects of communication. The phenomena of language and its relation to code preempted considerable attention especially with the failure of mechanical translation to meet its expected objectives during the late 1950's. Information science today is largely preoccupied with the library-like problems of indexing, abstracting and information (materials) networks and design (119).

Since the relationship of Weaver's three levels of communication problems remains one of analogy, lacking any precise mathematical formulations, communication science has of necessity been concerned with the Gestalt and in particular man's relationship to it. This has sometimes been called a unitary approach to communication which attempts to understand and relate both cybernetic theory, as well as mathematical and eletronic concepts to the source and destination of messages. This is more popularly known as the five W's of communication which are usually described in sociological terms.

It may, of course, not always be possible to perceive a message per se. But since all messages exist in some channel, it is possible with appropriate instrumentation to detect (perceive), measure and analyze modulations in the channel. From these modulations, it may be possible to reconstruct the message or at least its homomorphic descriptor set so that it can be perceived and interpreted by the receiver. Considerations of channel modulation, message reconstruction and fidelity are problems investigated by information science. Information science looks for semantics in the message or its homomorphic code and not necessarily in sender or receiver.

Content analysis overcomes this weakness by inferring about semantics or intention in the sender or receiver and, by statistical analysis, rules out the randomness of chance, the very thing information theory is designed to measure. Content analysis hypothesizes about communication patterns from content categories in order to ascertain how the source and receiver are codetermined and therefore predictable. Information theory is a distinctly different study from communication and is not to be confused with either communication science or information science. Information theory studies processes that are neither logical nor deductive in any of the meanings in which these terms are usually understood. The processes studied are the stochastic evidences of modulation in some channel and in relation to channel capacity. The probabilities of the stochestic phenomena are determined elsewhere, e.g. in communicative endeavor or in information retrieval.

Information theory often has a symbiotic relation to computer science and together may be viewed as the theoretical and application aspects of electronic machinery and automata. Information theory and its concomitant study, artificial intelligence, may someday serve as a unifying concept for both communication science and information science in a manner analogous to that of Einstein's "unified field theory." For the moment however this hope has not been realized. The literature of information theory in this regard remains vague and of little theoretical use for communication science as distinct from its technical and computational aspects which are of utmost importance.

Many attempts have been made in a concerted effort to develop a unified approach to society and to knowledge, particularly in this century. There have been some surveys of these developments usually from a particular communications point of view. Dean Barnlund (79) has analyzed developments in communications in order to locate his study of interpersonal communications including guidance, counseling and small group processes. Lee Thayer (66) considers current specializations which apparently have to be reviewed for their contributions to an understanding of communications in organizations and systems. Alfred Kuhn (24) departs from the traditional and linear model, an approach favored by Barnlund and Thayer, to explicate the cybernetic model for interpersonal, group and social communications. Philosophy has contributed many syntheses of its own (120), and Harmon (121) even makes a case for information science within a supra-system of knowledge as a method for predicting break-through syntheses.

At the moment there appears to be two major approaches toward a synthesis of the field of communications, the traditional and the cybernetic. The traditional synthesis is a linear consideration of the five W's of communicative behavior which is nicely summarized in Lasswell's famous phrase (122), "Who? Says What? in Which Channel? to Whom? with What Effect?" This model in one form or another is ubiquitous and has been around since the time of Aristotle. Even Shannon had nothing new to say about the model per se, although his insights into message transmission were significant enough. The traditional model exploited the findings of the descriptive and traditional social sciences of anthropology, sociology, history, economics, political science, psychology, and education. It would appear that recent developments have made a significant contribution to a synthesis of the "traditional" social sciences (123) (124) (125) (126).

Information theory as developed by Shannon deals with the effective coding, transmission and reception of messages in communication systems. There is no necessary consideration of the value or significance of the information involved in the communication process. Bloomfield (127) and Sapir (128) helped to establish linguistics as a science for investigating language structures and the principles underlying the organization of languages. The historical changes and relations between linguistic codes were investigated by others as well as complex patterns of verbal behavior (129) (130). The critical analysis and clarification of sign and cognitive behavior was investigated initially by Korzybski (131) and Morris (132). The discipline of sign behavior has developed theories of verbal and nonverbal naming, signaling and symbolizing, and has related these to psychology (133) and to cultural anthropology (73) (134). Kinesics (77) and ethology (135) have added to the understanding of communication science.

The second synthesis which has emerged in recent years is more of a Gestalt than a linear model. It has grown out of the work of Norbert Wiener in cybernetics (26). The basic model of detector, selector and effector is relatively simple, but its implications for communications are certainly complex and its effect enormous on the study of society, organizations and interpersonal relations. The cybernetic model has revolutionized the traditional social sciences and trichotomized the newer approach to the social sciences into such lines of inquiry as communications theory (information theory, cybernetics, linguistics, and sign behavior); preferential behavioral theory (game theory, decision-making theory, value inquiry); and general systems theory (operations research, bionics, automata and artificial intelligence, futurology) (136).

While the systems model of communication utilizes the findings of all fields of human knowlege--humanities, social sciences, science and technology--the linear model of Aristotle and others has mainly employed the results of traditional social science inquiry (137). In analyzing any communications situation , the sender and receiver must be identified out of the total population. The "who" and "to whom" are described in sociological terms. The social characteristics of sender and receiver are signs of communicative behavior that become part of the message (the "what") and influence its interpretation. The message indicates the referential content of the symbols used and as determined by the source's intentions as well as their expected influence on the receiver. Content analysis is the social science method employed in order to more rigorously control the variety of interpretations. As a result, the social role and status of both sender and receiver can be predicted which will change, distort or enlarge the message.

Communication science is the study of interrelationships of the Gestalt of human activity with the totality of the environment. Communication science investigates reciprocal intentions or meaning within or among adaptive control mechanisms and organisms, and the significance of information modulations upon behavior. It includes information science which primarily measures the range of information modulations that are possible from a store of recorded knowledge, and secondarily considers their societal patterns and personal significance.

Social science also provides the concepts and the tools to analyze transactions in the wider interpersonal and social network within which communication takes place. A message to be a message whether from a person or group is usually followed by a response. The reply indicates that the transmitted information has been acted upon. It is only then that the participating individuals, the interpretations, procedural rules and symbol referrants can be identified and eventually more fully analyzed for research purposes. The disciplines of counseling (10), group dynamics (11), professional development (1), and community development (138) are significant for an identification and analysis of the control rules of the various contexts within which communications can occur. Identification of the "where" and "when" leads to an understanding of the context of who can talk to whom, about what, in what manner, for how long as well as what happens in case the rules are violated.

Analysis of the message raises additional questions of media and channel consideration. The "how" of message design is in the fields of linguistics and code specialization. The task is to discover how nervous impluses and sounds have been recorded, transmitted and received in a wide variety of disciplines. The linguist (139) and coding specialist (3) are joined by the gesture expert (77) (78). The "older" communications media of the fine and useful arts as well as social spectacles have all contributed to media and channel design and cannot be ignored. The fine arts by giving expression to inner events through shape, color, movement, texture and sound create nonverbal cues to which others respond (140) (141) (142). The useful arts give shape to the external environment according to the assumptions and conventions of a particular period. Structures and objects become symbols for communication (143) (144). The social games and spectacles provide for message exchange where behavior can be analyzed (145) (146). Participants in such games assume prescribed roles and follow established rules of the game (147) (148).

The final component in the linear model of communication is the effect of the message upon the receiver or the audience. This is the concern of audience and market research (149) (150). Information about effect is obtained by correlating the message content with the actions which subsequently occur. Mass communication research has analyzed the effect of mass media upon audiences (151) and upon the social system (152). Mass communication is an aspect of social psychology. Vance Packard (153) has dramatically discussed the effect of propaganda and advertizing in influencing people to act. Libraries have their public relations programs. Political thought reform is used in "brain washing" to change the belief structure of people (154). Business organization develops "information" programs to improve efficiency and the effectiveness of administrative communication channels (155).

It should not be inferred from the foregoing that the linear model of communication is obsolete or that its areas of concern can be eliminated from the considerations of communication science. To the contrary, the elements of institution-sender, messages and codes, and modes of behavior become essential components in the cybernetic model. In addition, and central to Wiener's (26) formulation of the cybernetic model are the concepts of entropy, information and feedback. These concepts are embedded in systems theory and are hypothesized to be the functional components of an adaptive control organism or mechanism (24).

Today we are in the midst of an intellectual development which has had a profound impact upon the study of communications. The growth of a gestalt conception of communication has resulted from the movements toward a unification of science during the second quarter of the present century, and with the work of policy science pioneers such as Parsons, Rapoport, Simon and Shils. Sometimes called the systems approach to knowledge, it has grown rapidly in importance and significance for communication research. Systems theory has had a considerable impact upon communication science by widening its scope of investigation to include relationships beyond the considerations of Aristotle's elementary processes of sender, receiver and data transportation. At present, information science and communication science vie with one another as the integrative profession while systems theory may be the integrative discipline.

The essential elements of a cybernetic system are readily understood even though the implications for the disciplines and the professions are often complex. The primitive elements of a cybernetic system are called the detector, governor, effector. These primitive elements help the cybernetic system achieve its first level (or survival) operational purposes: to process information, to maintain equilibrium or homeostasis, to feedback behavior and to acquire knowledge of results.

The cybernetic system differs from the cybernetic model in that the system is adaptive to its environment. The adaptive control system not only responds but adapts itself to environmental imperatives in order to survive. In so doing the adaptive system not only prolongs its opportunity for survival but also detects and exploits the emerging range of possibilities for satisfactions over and above mere survival. Adaptive control is the basic dynamic of all cybernetic systems whether it be a person, an automaton, a group, community or society.

The most readily available example of a natural cybernetic system is the pupil of the human eye which expands or contracts inversely with the intensity of light. There is a sufficient intensity of light which is necessary for sight. This range must be maintained for the proper functions of the eye and may be called the equilibrium or homeostasis of the eyeball. Available light or information is detected by the retina and the light stimulus is referred to the appropriate brain cells for interpretation and action. The brain cell or governor interprets the intensity of light and the pupil as effector is made to contract or to expand in order to maintain the desired homestasis or range of light intensity necessary for sight.

A unified model of communication is feasible and possible, based upon a very few principles which are available in cybernetics. Hoemostasis accounts not only for the principle of stability, but also for the resolution of change and growth.

Homeostasis is accomplished through transactional processes within ever extending fields, including the reciprocal relationships observable in multiple systems. It is both a theoretical position and a system of analysis which is not simply a response to a stimulus, but a process occurring in all parts of a system. Finally, the transactional process requires communication of information at many levels. These levels vary from the signals which are characteristic of mechanical and biological systems to the symbols which characterize social systems.

The assumptions and principles of cybernetics are sufficiently general to consider it a unified approach to communication. As a systems model, it suggests itself as a powerful tool for communications analysis which can include in its scope a broad selection of existing knowldege about human beings and their relationships. The language of models and systems analysis can be used to diagnose interpersonal relations. This "language" express such transactional behavior as components of communications, organizations and the self-stabilizing interactions of an entire system of culture. "Cybernetics offers both a language and a set of concepts to use in molding these principles into a theory, relating information processing to the activities of learning, thinking, knowing and understanding." (156)

The language of the cybernetic approach to communication, or to any other adaptive control system for that matter, is designed to be universal. Neither vocabulary nor method of analysis need be changed from one field to another. The purpose is to reduce the number of concepts needed to understand the world and human behavior in mutual cause-effect relations i. e. control systems adapting for survival value. Output includes the extraction of information from any given input stimulus as well as a change in the information state of the system in a new equilibrium. Survival is learned value. Learning results from experience where a given input elicits a different output than previously. The analysis of the detector and selector or interpretive stages of the cybernetic model are dependent upon the findings of psychology, communications and decision-making. But once the message to be communicated has been created, the effector phase of channel and media considerations utilizes the findings of biology, chemistry, physics and engineering. Appropriate analytical tools range from mathematical communication analysis to the social science methodology of content analysis.

Cybernetics is the science of control and communication in the animal and the machine. Darwin and eventually Bergson (157) perhaps started the movement while Cannon (25) developed the groundwork for an understanding of the adaptive control organism. Mead (158) generalized the process and emphasized language as an organized way of responding and of accomdating individual preference in the social system. The limitations of the discrete analytical specialties of the linear model are offset by the concept of feedback where the output of a complex organism or machine can influence the information obtained by the source. Messages have impact. The impact may change not only the referential characteristics of the symbols, but also the code itself.

The advantage of the cybernetic model is that it transcends subject boundaries and views people and animals as adaptive control systems. The adaptive control system includes reception, transmission, evaluation and storage. Input is perception. Judgment is decision-making. Output is behavioral action. The findings of various newer social sciences are organized around these three components of the adaptive control organism or mechanism. Since abnormal behavior is always disturbed communicative behavior (159), communication science based on the cybernetic model can promote healthy personal and social conditions through the use of information control devices in communities and institutions as well as in the individual's perception, expression, decision-making.

The years of cross-fertilizing inquiry among the disciples and the interdisciplinary study of communication have been fruitful for a more unitary approach to communication. It is now possible to construct models and replace mere verbal speculation with computer simulations of the phenomena under discussion. For example, a computer can be programed to reenact the process and the equation resulting from the theory which describes it. Cybernetic theory is not determined by the influence of particular individuals nor by the variant interpretation of individual words. People, animals and machines can be viewed as systems of reception, transmission, evaluation and storage. A brief review of the cybernetic model as suitable for a general systems theory includes many intersystem theories.

There is probably no better place to begin than with the work of Grinker (160) in order to understand the newer integrative social sciences and their role in promoting a unified theory of communicative behavior. The galaxy of the newer social and physical sciences may be grouped into three clusters of integrative disciplines that have implications for communications science. Communications science includes the fields of information theory, linguistics and sign behavior. Preferential behavior includes game theory, decision theory, value philosophy and psychology. General systems theory includes operations research, cybernetics and bionics, and futurology. This trichotomy of the sciences and the humanities, upon which the exploitation of the media for human purposes rests, indicates its relation to general systems theory and especially to the cybernetic model. (161).

Game theory, decision theory and value psychology help to explicate the preferential behavior of the human adaptive control organism. Game theory as developed by Von Neumann (162) and related to the social sciences by Rapoport (163) has studied cooperative and competitive behavior patterns involving alternative choices and outcomes. Descriptive and normative studies of decision-making (164) have led to decision theory or the analysis of aspects of human behavior in which choices are made among alternatives. As a result of the work by Perry (165) and Reid (166) in studying the set of preferences that influence selective behavior, value theory analyzes the rationale of preferences made among alternative choices available to individuals and groups. Simon has pursued the ramifications of decision-making and value theory in his Models of Man (167).

General systems theory includes operations research, cybernetics and bionics, and futurology. General systems theory has grown out of the work of Lotka (168) and Von Bertalanffy (169) where generalized models, principles and laws are applied to the physical, biological and behavioral systems or their subclasses. Operations research (170) on the other hand is the applied component of general systems theory. It brings the systems approach, as well as its intellectual and interdisciplinary resources, to bear on organizational problems. Ashby (171), Nagel (172), and Latil (173) have explored the relation of software and hardware in operations research employing computers, automata and other control devices. More recently, general systems theory is being taken into the future (174) as new multidisciplinary approaches begin to investigate the cities of tomorrow and their needs for computers, communications, education, population, business and industry.

Following Ashby's postulate as the theory of all possible machines, organisms and combinations, communications science including cybernetics has developed stature in its success as an integrative discipline and as a guide to the planning of individual studies and components of many research strategies. As a result, the uniformities among the various subject and professional disciplines have been recognized and employed to better advantage. Integrative benefits have been derived from comparing theories in diverse fields. The generality of various research findings have been successfully extrapolated to the gestalt. Communication science investigates the isomorphy of laws in different fields and the structual uniformity of different models. These models transcend the traditional disciplines and are applicable to phenomena in several fields ( ). Communication science seeks to promote cooperative or competitive adaptive behavior for valued ends by investigating entropy-reducing machines and organisms as they cycle through space and time.

Cybernetics, of course, is the fundamental discipline upon which general systems theory is largely built. Cybernetics as developed by Wiener (26) investigates the regulative processes of physical, biological and behavioral systems. There is a considerable emphasis on feedback whether in the machine or central nervous system. In cybernetics, living systems are studied by analogy with physical systems. Whereas, in bionics it is the reverse. In bionics, physical systems are investigated by analogy with living systems. Bionics (176) employs the finding of the science of living things and applies them to the solution of technological problems. However, in these analyses and especially in the relation of systems theory to operations research, power and social policy whether interpersonal or societal cannot be ignored (177) (178). Power in the physical sciences is the ability to do work, and in the social sciences the ability to satisfy wants.

Society's motivational values stem from power and social heirarchy in institutions and organizations. Social policy, ie. the governor of a society's cybernetic system, is set for conformity and continuity. There are many environmental parameters upon society, but the operationally pertinent ones are those of a negotiated cultural consensus together with the societal means for enforcement (2). Pressure for conformity varies directly with deviations from it, while deviation varies inversely with pressure for conformity. As in all human affairs, however, there is circularity in the promulgation of this social parameter. The content of culture varies with the motives and concepts of the people, whereas individual motives and concepts vary with the content of the culture.

Receivers of communication messages have as individuals different personalities and as collectivities (societies) different cultures. A society has both cultural values and cultural concepts. Culture is both the input and output of a society. When input/output content is identical the society remains a closed system. However, in an open system cultural change is an example of disequilibrium between input and output. Differences in individuals and in societies result from the ways in which information is processed and interpreted for cultural and motivational development as well as concept formation.

As personality is to the individual so is culture to the society. Both are maintained by the common language as well as the library and information system. As in personality, culture has both motivational values and concepts. The value system is the sum total of the values of subcultural groups in manners, morals, courtesy, and conscience. Value systems may be examined in part in relation to their degenerate edges which include sterotypes whether active or discarded. Culture accommodates change whether the cultural change stems from deductive sources (179), or from scientific developments and discoveries. On the other hand, language maintains the concepts and their referents especially in written form. Recorded information may be studied individually and free of the distortions and limitations of human memory. Culture overcomes the limitations of an individual's experience by naming concepts beyond his range of experience. By means of the culture's language the individual can communicate concepts without names. This feat is accomplished by coordinating signs for the concepts without names (139). In addition, by means of the cultural coding system individuals can go beyond the information received, to fill in gaps and extrapolate (180).

Personality and culture result from the particular and characteristic ways in which individuals and societies use information in the decision-making processes. It is impossible to obtain complete information and make an entirely rational decision when involved in the two important steps of formulating the scope of the decision and listing the alternatives to be considered. The span of attention available to men is limited (167) and the costs in time, money and personal strain may be prohibitive to assemble information and to evaluate it (181). The loss from a wrong intuitive decision in many instances in human affairs is much less than the costs of information gathering for decision-making in order to ensure the pay-off of a completely rationale choice. Indeed, there is no way of knowing whether the information is worth having until it has been collected.

> "Electronic computers and data processors may change the location of break-even points in such matters, but can never eliminate the fundamental problem. There will always be situations, and numerous ones in which (1) the information required to assure correct decisions will not be worth its costs, or (2) it will not be worth the cost of acquiring the preliminary information to determine whether the main information would be worth its costs" (24).

Since the learning of concepts and the development of preferences are largely intrapersonal, or intrasocietal, there is final area of concern which is interpersonal and transactional and include negotiations. Transactional adaptive behavior cannot be ignored because other people and the environment control many opportunities that are needed. In this, there is a shift in emphasis in the cybernetic model from the process of satisfying wants to the ability and power to do so. Any change in preferences and in opportunities entails a shift in power as well as influence and control. Almost any action of one person with another produces feedback. The action and feedback include to a considerable degree the transactional use of power. The bargaining strength of one individual varies inversely with his own preferences (or values) and directly with the preferences of the other person. Reciprocal demand is the basis of all tranactions whether interpersonal or societal (182). The limits on equilibrium within the transaction are set by the parameters of available alternate opportunities.

The interpersonal transaction does not employ unlimited power. Motivational (or moral) power is the ability to control or change preferences while intellectual (information) power can control the awareness and conceptualizations of opportunities. Power is only as strong as the effective preference. Strategy is used as a bargaining maneuver to work on, and further reduce the limits of that power when there is some overlap in effective preference. Tactics, on the other hand, work within the power limits and involves deception. Because deception as to preferences and power control must be credable, successful tactics is a highly skillful operation. Interpersonal transactions include a vast gamut of types of relationships from friendship to coercion, from discovery-learning to rote memory.

Intellectual power in the cybernetic model is the communicating of information while moral power refers to the communication of motives. Effective communication influences the receiver's behavior as well as his thinking. Freedom of opportunity varies directly with the increase in number of information sources. Intellectual power depends on the ability to present ideas clearly and interestingly. It also depends on access to communications media. On the other hand, in order to maintain a bargaining advantage, the flow of information can be curtailed about the matters under bargaining. Ownership and censorship of the media of communication can do this for a whole society. In addition, where information cannot be controlled directly, perception may be modified by criticizing the communication or raising compelling points of view against it (183).

Organization adds but one element to the transactional model. Structured cooperation is essential for the production of societal commodities, the development of goals and the shared experience of values (66). With organization, complication develops not only in increased roles, but in the relationships among them. Complex organization is needed in order to establish the organzation, do its work and distribute the product of its activities. There are three major types of roles in organization. Sponsors set up and maintain the organization. Sponsors as owners control the basic production and perform employer functions. The staff produce the services and commodities created, and for maximum effectiveness should share the goals of the organization. The recipients are the direct objects of organizational services. Library patrons, for example, constitute the audience or consumer group towards whom the work of the agency is directed. As in the two-person interpersonal model, power is extered through transactions and the communication of information and motives.

The whole society is an organization. It is a collectivity of people having a common government and system of culture. The government is the the formal organization of the society. Property rights constitute the major set of rules about transactions. The rules governing transactions constitute the law and the work of government. The scope of government is total for its society since its actions as well as inactions cover all possible actions. Transactions among citizens are going on continuously. If government does not intervene, this state of affairs sanctions those transactions. The government's power is a product of its place as the strongest coalition in the soceety. The peace and reason of the society can be guaranteed only so long as government is not challenged. The best long-term legitimization of government, as it is for any organization, is in having the receivers believe that government serves their interests. The chief problems of a government are those of running a giant cooperative with diverse interests among its sponsor-recipient members.

From a cybernatic systems-model point of view there are two basic purposes for communication: to inform and to motivate. Communication functions to alter a receiver's concepts and to change his preference and feelings. In the construction of a message, it is necessary to build in informational and especially motivational referrents (184). However, according to the socio-drama model of communication (183) and the experience of the mass media in persuasive communication, motives are changed first and then concepts are developed in a manner analogous to the process of rationalization. Educational communications (   ) on the other hand is usually more evenly balanced with some priority given the instructional or informational function.

In transmitting information accurately, three conditions must be taken into consideration: signs must be avoided which are not in the concept repertoire of the receiver; each sign must have the same referents for sender and receiver; both must accept the same syntactical rules. In practice, however, these conditions are similar enough to achieve overlap when accomplishing the purposes of the communicative enterprise. Grammatical conventions and concept definitions can be accommodated fairly readily, whereas, difference in concept referrent remain at the core of semantic problems in communication. What individuals "mean" by concepts or by the images they have are always personal and different from anyone else. The essential prescription is to word messages in the vocabularly of the particular audience.

In transmitting motivation, the purpose is to affect feelings or mood which will result in a shift in emphasis in the semantic content of the message. The technique is to attach valence laden words (adjectives, modifers) to the concepts being transmitted which are expected to inculcate the appropriate motives. In defense, the receiver learns to ignore such value-laden adjectives until he can determine for himself whether they are acceptable to his own value system or not.

Besides the considerations of transmitting information and motivation successfully, there are additional concerns of planning for feedback and of selecting appropriate media and channels. Communications sent out to the general public must coordinate or at least choose among newspapers, radio, billboards, television, speeches, mailings, and telephone. Bloom's taxonomy (185)

(186) is one source of behavioral objectives to be built into educational communications message design which presumably keep the receiver's objectives uppermost. On the other hand, each commercial and public interest has its own behavioral change objectives in mind. In any event, the selection of and effective medium of transmission requires knowledge of content, various media capacity, previous experience of audience, attention span, intelligence and receptivity to aural, video or print stimuli (187).

THE SEARCH FOR ORDER

The history of communication is the history of the human race. Through communication the animal man became human, developed his mental capacity and subdued the natural environment. Without communication man could not have maintained his rationality, nor his society, nor his culture. Each of these--rationality, society, culture--depends for its existance upon the concepts (or symbols) which man has created. Concepts are developed in intrapersonal communication, maintained as nodes in the lattice of culture through interpersonal communication, transmitted in discourse units, and integrated into the cultural heritage through library organization.

Man has been about the business of creating order after his own likeness and fashion ever since he acquired the skill of language. Perhaps he had been discontent with the natural order of the environment before acquiring language. But language, eventually writing, and particularly the library function, made it possible for man to create an environment of culture, society and intellect that had no parallel in the natural world. Through communicative activity man has continued to exploit the human possibilities of the natural environment.

Apparently everything natural, even in his own psyche, over which he does not have control, irritates man. Obviously not all men are as concerned as others. But enough men have been concerned about disorder over the historical record and have acquired varying degrees of leadership influence through overcoming disorder in the untidy universe. Some men have always worked to offset: natural disorder such as earthquakes, inclement weather or diseases; social disorder such as wars, riots, or subgroup deviance; individual disorder such as personality defects, lack of knowledge, or undesirable behavior.

In any event, some condition which appears to men as not being under control to their liking has always been a strong rallying point for action. The awareness of some condition beyond human control provides strong motivation for change. Consequently programs of social communication rarely are effective unless both the disorder and the desirable order are articulated for the masses of men. In the phraseology of the sociodrama model of communication, this is what is known as creating a "villian" and a "heroine" in the developments of community life. Strange as it may seem, it is not altogether facetious to expect that citizens will become heroes in the rescue operations (2).

Knowledge of disorder had always been of explicit interest to those engaged in communicative activity and it has always been paired with its opposite: sin and redemption, punishment and reward, irritation and comfort. In cybernetic terms it is known as disequilibrium and homeostatis. In this age of great specialization, cybernetic theory has served to call attention to the fact that if communication is to have social relevance it must overcome the narrow confines of any discipline or profession. The maintenance of order is society's general charge to communication. To maintain order the communicator must know order, for this is his ultimate goal. He must know disorder and recognize it in its actuality or in its potentiality. And he must know control either to prevent disorder or to convert disorder into order.

Dissatisfied with the untidy universe, man has created and continues to build a material culture, a social culture and an intellectual culture. Each culture is composed of material, social and intellectual elements. Each element of the culture has both a theoretical and practical (technological) base. Any or all of these elements may become communications content depending upon the interest and need of individuals or groups. Each element--material, social, intellectual--has a complete economic system. A whole series of operations exist by which the element is produced, stored, distributed, and consumed. For example, new scholarship is constantly being produced in research laboratories. It is packaged in reports, distributed in reports or journal articles and consumed in commercial applications of a very practical nature. Whether the field be the sciences, social sciences or humanities, a similar process goes on.

The intellectual content of our civilization, called scholarship, includes not only all factual knowledge, but also all the ideas in which men formulate their beliefs, their judgments, their emotions, their attitudes, their intentions and their aspirations. Scholarship is the sum total of those beings of reason (symbols) which men have conceived, and recorded, in order to explain the universe and the environment in which they live.

The social elements, won by social sciences and upon which social policy is based, are equally complex and far-reaching. Our social framework includes the local, state, national and world governmental administration with all of its judicial, legislative and service ramifications. In addition, there are innumberable industrial, commercial and financial corporations as well as the vast variety of personal, vocational and voluntary associations. These social elements are won by the social sciences upon which increasingly social policy (i.e. social organization) is based.

The material elements of culture include all of the physical equipment. These material elements are won by science and technology, and include not only personal property, paved streets, water mains and the goods in warehouses and stores, but also the dairy herds in Wisconsin, the cotton fields of Texas, tea plantations in India and Ceylon, and the fishing fleet off Norway. Both the society and its environment becomes larger. For example, the United States was occupied first by a few hundred Indians, then by a few thousand pioneers, and today by millions. Actually, today, we occupy the whole world. We draw upon all world resources. We are deeply affected by every major change in any part of it. Mass communication becomes essential to our very way of life.

These elements of civilization--intellectual, social, material--have not been the unique identification of any one writer. The analysis being followed is that of Butler (74) but others exist. For example, Hall (73) considers three types of social awareness--the informal, formal and technological. In a similar way, Landheer (83) categorizes the sum of man's wisdon into salvation-knowledge, cultural-knowledge and achievement knowledge. Thayer (66) on the other hand points out that communication occurs in three contexts--the intrapersonal, interpersonal and social.

Analyses such as these serve a useful professional purpose. Considered as elements of the social environment, an awareness of their characteristics can provide insight into the information surprises sought by individuals, groups and communities. As such the analysis can provide a matrix for contextual considerations when negotiating an inquiry for retrieval or setting behavioral goals for message design. Such elements identify contextual facets for subject analysis whereby content can be analyzed for social relevance.

In any event, for library communication, these contextual facets have helped to determine the situations within which communication can occur. In creating these situations, the librarian endeavors to relax the formality of the interface between user and knowledge. The library store has to be logically organized and especially indexed or else no effective retrieval would be possible. But as with the symbols and logic of language, ambiguities occur unless the referrent and/or context is considered in order to overcome such limitations.

Librarians will of course in particular understand the role of facet/subject analysis in communication. Content classification schemes employ the facet to account for an author's intentions (i.e. social context) in his message design. Context analysis reveals both the size of the retrieving audience as well as the degree of formality/abstractness. The larger the group, the more objective and abstract the message tends to become, i.e. the referrents are less visible and the context is of less value to local or individual vested interests.

Context analysis provides an understanding of the underlying role of order in human society and thus of communication. Order is negative entropy and is achieved by some teleological activity or knowledge of control. Cybernetic theory provides an intellectual rationale for prescriptive behavior which, when executed, changes the random sequence of events in desired ways and toward specific outcomes. Knowledge of this kind goes beyond prediction in the sense in which that term is often used in science, although prediction is involved.

The sequence of events under certain conditions may be predicted even though the professional knowledge needed to change those events and to achieve different, but specified outcomes, may not be available. It is the difference between knowing that the disorganized tissue growth called cancer often leads to death, and knowing what can be done to avert such a natural outcome. Knowledge of control represents what has sometimes been described as prescriptive theory.

Knowledge of control develops from and is directly related to knowledge of disorder. It is difficult if not impossible to raise the question of knowledge control until questions on knowledge of disorder are answered. It is difficult to know what specific knowledge is required for practice until it is reasonably clear for what end that knowledge is to be used. In addition, the area of the profession's primary responsibility to patrons must be investigated.

In the end the boundaries of communication will have to be established in accord with the society to be served. Society will delegate judgment for an area of professional responsibility only when there is proof that the profession has acquired the knowledge needed to solve problems of social significance.

If there is an area for study and theory development unique to library science, it will evolve only through the study of communication and the asking of questions in a way that is not characteristic of any other discipline or profession. This is so not because it is the "thing to do," but because only in this way can the knowledge needed for practice be acquired. As is true in other professions, these will be manmade boundaries, but they may be less arbitrary because they result from the profession's responsibilities to society. A procedure such as this will require a fresh and creative approach to the consideration of alternatives, and with an originality expected of outstanding leaders in other disciplines.

The phenomena with which library science is concerned include the general class of behavioral disorders. These are disorders of a social, interpersonal, or intrapersonal nature, as well as of context and behavioral system disorders. These are the ways of behaving that characterize the intellectual and social life of man and form an organized and integrated whole. This system way of behaving, is determined, regulated and controlled by, many factors of a biological, psychological, and social nature. If these conditions of communication are not met, or if there is a breakdown in the regulatory and control mechanisms, malfunction will occur as disorganized or erratic behavior. These problems represent disorders of the behavioral system.

Cybernetic Fundamentals:

Man has created two major methods of control: scholarship or knowledge and communication. Contemporary scholarship is based on the scientific method. An essential assumption of scientific knowledge is that there is order in nature and that this order can be discovered and understood. By order in nature is meant that there are regularities in the arrangements and sequences which underlie and govern the relations of physical, biological, and social objects and events. Out of this order, and its discovery and verification, have emerged the laws, concepts, and theories of scientific scholarship. Knowledge of order refers to that knowledge which describes and explains the "normal" state of man and the "natural" scheme of things.

Knowledge of order has been the distinctive focus of the basic sciences. This knowledge represents what has been learned through the scientific method about man and his universe. The biological and behavioral sciences, each from its own perspective and through its focus on particular objects and events, have provided knowledge which helps us to understand biological man, psychological man, and social man.

There are deficiencies in this knowledge, and there is more to be learned from each of these perspectives, but a solid base for understanding is available. Even more importantly, there are signs that scientific interests in the study of man will begin to coalesce. A unified theory of human behavior may eventually emerge through the work of several basic sciences. It is to be hoped that the humanities may some day receive credit for and be supported as the major matrix of theory generation in the social sciences.

Research can be viewed as a kind of openness to empirical reality, conducted according to plan, and concerned with the production of knowledge rather than with the immediate production of practical results. Though practice is at times overlooked as a **significant** outlet on reality, it is quite generally held that research is concerned somehow with knowledge -- or in other terms, concerned with the production of theory.

Scientific research is not the only approach to empirical reality. Professional practice, past or present, furnishes encounters with reality as well as experience outside professional practice. This source is no less empirical if remembered and **analyzed.** If the analyst is a skilled professional, the reported accounts may warrant a confidence level as great as, or perhaps even greater than by some more artificially-made observations taken by persons skilled in certain types of research activity but persons less intimate with the reality being described. Research in ongoing behavioral environments is a widely accepted method of social science research.

Some attention to the structure of predictive theory hopefully will initiate consideration of the following things: predictive theory presupposes the prior existence of more elementary types of theory; predictive theory is not the only kind of theory dealing essentially with relations conceived as between states of affairs; and there is a type of theory which builds on theories at the level of relations between states of affairs. The purpose of the scientific method is to create new knowledge, i.e. an understanding of the regularities or order in the natural environment. In so doing, the scientific method **encompasses three steps. First,** new facts are isolated and described as observations. Then the relationships among the facts are explored and finally developed for their value in making predictions about events and sequences of events. Consequently, the basic steps in the scientific method are: to isolate facts, to establish relationships, and to make predictions (1).

In addition to factor-isolating and depicting research (presupposed by predictive theories) and to predictive or causal research, there exists another kind of research which presupposes and builds on these other levels. This fourth-level can be called prescriptive research, goal-incorporating research or perhaps better called situation-producing "research". Situations-producing theories do not conceptualize factors, factor-relations, or situation relations, but attempt to conceptualize desired situations as well as conceptualize the prescription under which a professional person must act in order to bring about situations wherein communicative activity can occur.

Cybernetic communication must include an action orientation that aims to shape reality, not hit or miss, but by a conception of ends as well as means. This conception of ends and means is based on a conceptual awareness which is considered adequate to take into account reality in its structure, course, and potential. Given this purpose, the conceptual apparatus required is necessarily more elaborate than needed to support any merely predictive research. Communication endeavor must he based on theory at the fourth or highest level--namely, situation-producing theory because it presupposes the existence of three prior levels of research, where predictive research is a kind of third-level theory.

Situation-producing communication may be called highest level theory because each of the other levels of theory exists in part at least to allow or provide bases for the next level of theory. But situation-producing theory is not as such developed for the sake of producing a theory of more elaborate structural level but rather for the production and shaping of reality according to the situation-producing theory's conception.

Situation-producing communication is produced to guide action in the production of reality. All theory exists finally for the sake of communication. Communication must include theory at the highest level since either the aim is practice or else communication is no longer a profession as distinct from some mere academic discipline.

Role of Theory in Cybernetics:

Research alone will not produce a theory of any kind -- let alone a situation-producing theory. It is necessary to call attention to other contributions, especially the less "empirical" ones of searching the literature (properly conducted) and searching the mind itself, so that research can function in its proper role in relation to those other factors which help in the production of theory.

Research can serve a useful function in the testing of a theory, or even in stimulating thought toward the production of theory. But there will be a long wait if anyone waits for research to invent a theory. Risk-taking speculation is required for proposing a theory or even of an hypothesis as part of a theory. Given the theory, a planned encounter with reality can help comment on whether or not the theory seems to fulfill its intended purpose, i.e. can comment on the empirical support or validation which is to be given the theory.

Research may be of help to test or stimulate a theory. The invention of a conceptual framework is not the task of research. Awareness of the inability of research to create theory has two important consequences: first, there will be less purposeless behavior in research activity; second, proper attention and energy will be directed to conceptualization itself as an important element in the procedure of theory production. Research may also function as a divining rod, pointing out areas for further exploration because of sensed promise.

The purpose of a situation-producing theory as a conceptual framework invented for some purpose is to allow for the production of situations to meet social objectives. The three essential elements of a situation-producing theory are: goal-content as an aim for the activity; prescriptions for activity to realize the goals; and a survey list to serve as a guide to current prescription as well as preparations for the future. The goals specify features of situations to be produced. The prescriptions or methods give directives for activity which will produce such situations. The survey list calls attention to the necessary aspects of communicative activity.

Any communications oriented activity must be guided by a theory at the situation-producing level. Looking at the elements typical of a communicative situation, and at the methods needed is a first step towards socially relevant communication. Emphasizing goal as a theoretical entity has three advantages: profesdions become articulate about the explicit features of what they desire to produce; professions consider goals as giving explicit practical direction rather than merely emotional tone; and the essential and respectable function of a professional objective is evident in the formulation of a practice theory. The resulting program becomes professional rather than merely guided by personal considerations.

Calling attention to prescription is an essential element in the theory of a profession. It stresses the extra-academic features of a profession and its situation-producing theory. Demand for prescriptions for the realization of stated goals stimulates practical thought. Stating prescriptions creates a demand for the practical realm and its relation to the ideally desirable.

In order to exert intellectual leadership, the professions need a more explicit theory of their function in producing communication situations. A situation-producing theory of communication for the professions exists in prototype ( ) ( ). According to Dickoff, each profession is aware of some state (s) of disorder, social or personal, which it endeavors to overcome. In addition, each profession employs a set of control devices, or professional methods peculiar to it, to bring order out of confusion. In other words, the profession in some way helps people, groups and communities achieve negative entropy. It is in one or more of the areas of dyad (19), group (11) and community (183) that communicative situations are produced by a profession.

There are, no doubt, as many cases of disorder or entropy as the plethora of perceptions of every individual in every culture. However, for the purposes of categorization and analysis, many writers have posited **three** major areas in which entropy is continuously present. For convenience, the codification of Hall (73) may serve as a summary. He has listed these areas as informal (personal), formal (social) and technological (environmental). Hall discusses the achievement of order in each of these. The three areas appear to constitute the overriding concerns of any culture in reducing entropy and thus become the source of purposes or objectives for any society to achieve.

The cybernetic model of communication is unique in its ability to accommodate both the contexts in which communicative activity occurs and the systems of entropy reduction in any culture. But before developing a taxonomy of communicative situations based on the matrix of contexts and systems, it is necessary to identify the general professional methods which a society creates and delegates to a profession in order for it to bring about an interface between the knowledge which that profession has to offer and the entropy-reducing needs of people in various cultural milieux.

According to Dickoff, the general professional entropy reducing elements are six in number and were originally phrased in the form of questions. The answer to each question is a general element and a more specific answer should be developed for each individual profession: (1) Who or what performs the activity? (AGENCY); (2) Who or what is the recipient of the activity? (CLIENT, PATRON); (3) In what context(s) is the activity performed? (SITUATION, SCENE); (4) What is the end point of the activity? (GOALS, TERMINUS); (5) What is guiding protocol of the activity? (PURPOSES, POLICIES, PROCEDURES); (6) What is the energy source for the activity? (MOTIVATION TO SERVE, TO PARTICIPARE, TO COMMUNICATE).

The objective to be realized in developing a professional situation-producing theory is to simplify the plethora of actuality by categorizing and grouping by structure and/or function the essential and relevant variables. A professional theory abstracts from the redundancy of community and library processes as well as from those knowledges, attitudes and skills which as a result of numerous library survey studies are believed to be especially pertinent to social relations and library functional organization. Abstraction and simplification permit a better understanding of "pertinent" fundamantals of socioeconomic and political life, and facilitate the reconstruction of the principal rules by which behavior under the area of the theory is to be governed and the rewards for professional roles in the community and the library.

There is a close relation between the standards and professional norms and the underlying and undergirding theories. This relation should be made evident in the professional goals, their specifications and communications behavioral constraints. Goals must include options for the individual to meet his desire to excel as a professional, as well as the movement of the collective towards purposive behavior. A theory incorporates fundamental social processes in its structure and processes, and makes explicit those processes which may be implicit in actual life. Professional practice is a mirror of community-library processes set up on the basis of various theories (see "Culture,""Systems Analysis," International Encyclopedia of the Social Sciences).

It is assumed that the social collective is an aggregate of adaptive control organisms and mechanisms (24). An intelligent adaptive control organism has three requirements in purposely pursuing existence: (1) internal organizing system and an explicit representation of the structure of its field of action whereby selection in acts and conditional readiness-to-**act** is made; (2) receptor systems for keeping itself up to date; (3) a normative or metaorganizing system whereby priorities can be set in goals for norms (188).

To prevent conflict (goal and program) when two or more organisms interact, a process of dialog i.e. communication must be used. When large numbers of organisms interact there must be some adaptive, goal-directed social superorganism. The Burke-Duncan sociodrama model of communication is posited as a fundamental guiding hypothesis. But the elements of the superorganism are themselves cognitive agents with interrelations of beliefs, norms and goals and the system must also have means for profiting from past experience. A **communications system will exhibit some redundancy as well as repetoires of subroutines or pattern in a hierarchical structure based on priorities.**

Perception of analogy between any two situations implies the discovery of matching subroutines. Each role or routine may evaluate the normative hierarchy of the other roles for compatibility with its own and so become goal-directed toward bringing the two into line with a view to cooperative benefits and cost duplication avoidance; e.g., human dialog occurs and the meaning of communication exists as a selective function on the organizing repertoire of two or more systems. The overview questions to be asked are as follows:

1. How can a community best organize its information flow and command structure so that communal goals are not at great variance with individual role aims and objectives?
2. What kind of a normative, metaorganizing social command structure facilitates mutual adjustment of norms? (Burke-Duncan theory).
3. What is a "good" normative system? (Develop theories which can be tested and the interactions of roles can be analyzed over a period of time.)

The system is essentially an inference based on the normative behavior of individuals, groups and communities. Two elements tend to alter reality: (1) informal information flow lines are largely unrelated to the official communicative endeavor; (2) input-output characteristics which depend upon each individual's evaluation of his role functions introduce uncovenanted transformations into the expected formal system. Negotiation is guided by certain categories of rules which have been abstracted from the Burkean-Duncan theory of communication. The following types of rules should guide the development and explication of communication standards for the profession.

1. Procedural analyses which indicate how the social game is played and the order in which behavior patterns can be expected to occur in library development for communication purposes (Dickoff situation-producing theory of a profession).
2. The analyses of mediation behavior indicates how impasses or conflicts are resolved when neither side has formal authority or power to get his way. (Arbitration theory, see "Negotiation," *International Encyclopedia of the Social Sciences.*)
3. Behavior constraints are role obligations which should be analyzed along with procedural and role specifications for each type of communicative situation. (See "Interaction," *International Encyclopedia of the Social Sciences.*)
4. Goal determination and the means for achievement of each communicative pattern should be identified in order to assist patrons to reduce anxiety in their roles through negotation. (Expressive theory, see "Anxiety," "Homeostasis,"

International Encyclopedia of the Social Sciences; and Franklin Fearing "Toward a Psychological Theory of Human Communication" in Dean C. Barnlund. Interpersonal Communication. Houghton Mifflin, 1968.)

5. Environmental response behavior patterns indicate how the environment is controlled and in what areas accomodation is necessary. (See "Social Control," "Social Structure," International Encyclopedia of the Social Sciences.)

6. Police rules describe the consequences of getting caught at breaking one of the game's rules of the social game. The consequences are usually two in number: reversion to a previous state in the **communication model (i.e. restitutive** law); punishment for having broken **a rule** (i.e. repressive law). Legal power serves the function of referee in the social game (besides applying mediation rule), notes when rules are broken and applies corrective action. The courts build on moral force of other citizens and their power to stop negotiating with criminal elements in society. (See "Rules of the Game," "Strategy". International Encyclopedia of the Social Sciences).

The theories of communication behavior which guide the situation-producing model, e.g., Burke-Duncan socio-drama are made explicit in the community activity of the professionals **reacting** to procedural and behavioral constraints. Purposive behavior, competition for resources and the public's attention, and negotiation are factors which are made explicit in the agency elements of a professional situation-producing theory. The communications model is based on self-interested individual roles. The collectivity oriented behavior which cannot be avoided emerges as a means of attaining individual role goals and is realized by investing some part of the individual's effort in collective action.

There is a symbiotic relation between behavioral theories and communicative activity. Situations producing communication is valuable as an intermediate and necessary step between speculative theory and formal abstract theory. The model is a way of translating a set of ideas into an experimentally controlled system of relevant professional actions before formulating a system of abstract concepts. Of course concept (theory) development is necessary. Concepts are imbedded in the rules of the social situation and must be identified before the relations between concepts can be observed, analyzed and eventually abstracted into a formal theory. (See "Diffusion," "Social Change." International Encyclopedia of the Social Sciences.)

In the search for order, librarians use all the instruments of communication in order to orchestrate community life. At times the elements of comedy are useful in making an issue, at others it may by tragedy. As communication librarians become adept at manipulating vested interests and motivating participation in the social game by maintaining the level of discontent while at the same time providing homeostatic situations on developmental plateaus so that a sense of achievement is not destroyed. Above all librarians assist people to find or achieve a sense of personal meaning and worth in community endeavor that for ages past men have found only in a work ethic.

CONTEXT OF COMMUNICATION

Language is the device by which each human being organizes and sustains his personality. The organizer of society, language is the central manifestation of culture and constitutes a framework within which concepts develop. In forming a concept of the meaning of a work, the individual must determine among various possible meanings. Lack of familiarity with the referent of the word limits the possibility of fine distinctions. Many social categories or classifications are learned deductively, that is more by formula than by extensive contact with their referents.

Language expresses the state of mind of the speaker, his beliefs and attitudes. Language may reveal his beliefs, feelings attitudes to the hearer, intentionally or unintentionally. Three major categories of intelligence which are transmitted from person to person by gesture and the word symbols of language have been distinguished: 1) the logical or intellectual category, which consists of informative messages; 2) the persuasive category, which stirs emotional responses and seeks to change beliefs and opinions; 3) the emotional category, which transmits only affect (189). The personality theorist and clinician emphasize the internal dynamics underlying attitudes in which the individual's need to preserve his self-image and self-integrity become more important than external reward and punishment (190).

Since the human ability to conceptualize is a significant and observable characteristic, the study of communication includes in its varying relationships to other aspects of human life. The essence of language is activity on the part of one or more individuals to understand what is in the mind of another. Words and language forms are not objects but elements in the total event which is communication (191). Consequently, the spoken not written words interacting in a context holds primacy in communication. Written discourse serves mainly as a data bank for "time-binding" purposes.

However it takes ability and commitment to invent, transmit and respond to symbols at various levels of abstraction. It is through the manipulation of symbols that human beings organize social cooperation and work to control the flow of future events. Korzybski (131) goes on to diagram the process as a structural differential which is similar in many respects to the concept of an adaptive control organism. Relationships exist between events and perceptual maps of events as well as language which maps perceptions.

The progression from event to perception to language is one of abstraction; and the truth-value of the abstraction varies directly with the logical validity of the abstracting process. Science following a natural order of evaluation ensures that our perceptual and linguistic maps represent the structure of events. Time-binding becomes socially useful because reliable maps rather than delusory ones are transmitted. As a result, sanity for the individual becomes possible and it must be remembered that Korzybski proposes his system both as a therapy and an educational technique.

Korzybski deals of course, with only one function of communication--the ideal purpose for reducing entropy in the personal and social lives of people. Used as therapy or educational technique, communication has as its substantive purpose the unfolding and building of personality. Through persuasion men are induced to restore the order of their psyche by entering into the substantive order by which a community is created and maintained. This of course is not a trivial problem: Jaspers (192) has pointed out the relevance of existential communication for the order of man and society.

But there are other purposes which communication serves. Symbolization of experience and the transmission of symbols, however is not always rigorously logical. Distortion and delusion, even hallucination, have been transmitted through the "time-binding" mechanism. Social cooperation has not always been free of the pathological; nor is the ability to control future events always intrinsically desirable.

Communication can be a social method for inducing people to behave in such a manner that their behavior will agree with the sender's purposes as in political, commercial or library public relations. The purpose is to induce in the human target (193) a state of mind that will fit another's behavior into the realization of one's own project whether propaganda, advertising or psychological management. Such agents of the communications industry are not always in the dubious position of destroyer's of their fellow-man's order. The functioning of a modern industrial democracy depends to a considerable extent on the effectivenss of well-conducted political and commercial propaganda.

The complexity of modern industrial society and its prevalence makes it difficult to identify or question the positive or negative effects on personal and social order of propaganda communication. The difficulty of raising questions let alone providing answers tends to be translated into the position that no questions should be asked. Perhaps because of this but in any case the communication media can serve as an intoxicant to the non-focused individual in the mass as Barnouw (193) would have it. Diversion can be employed by large numbers of people to escape from the sanity through science which was the hope that Korzybski had for the individual in society.

Whether mass communication is the cause or the result of the desire of the unfocused person for intoxication is perhaps a moot question. Certainly the mass media did not create a pluralistic society but they do flourish in a climate where the formation of opinion is left, through the various means of communication, to private initiative. The pluralistic society is supposed to facilitate the peaceful struggle of opinions. But the facts of power and the warring influences of the media scarcely resemble that pluralism of opinion which is supposedly the guarantee of a peaceful advance towards truth.

Communication is a vehicle for the discovery of truth. No truth, no value, no freedom is protected from the uncertainties of discussion. The essential function of communication is to promote empathetic interaction among men. Communicative activity establishes relations of association and of community based on the conceptions men have of their environment. The consequences of these relations evolve in dynamic discourse. Interaction based on common values creates the conditions essential to self-expression and freedom.

It has been contended that the mass media influence their audiences. But they only do so in the direction the latter already wanted to take anyway. Therefore, it is assumed that the general public exerts an influence and a subsequent re-influence on the controllers of the means of communication (190). Such opinions appear to be in the minority, however, the consensus is that mass communications represent an overwhelming power. This power has not always worked toward the public good but, at times, has forcibly manipulated opinion, attitudes and behavior.

Publications, as a general social process are seen as the creation and cultivation of shared ways of selecting and viewing events and aspects of life (82). Mass production and distribution of message systems transforms selected private perspectives into broad public perspectives and brings mass publics into extistence. These publics are maintained through continuous publication and program productions. They are supplied with selections of information and entertainment, fact and fiction, news and fantasy or "escape" materials which are considered important or interesting, or entertaining and profitable, or all of these. Publications can thus be the basis of community consciousness and self-government among large groups of people (194).

The media tell man in the mass who he is. They give him identity. They tell him what he wants to be. They give him aspirations as well as the methods to attain them. They tell him how to feel even when he may not want to. They give him escape. Such objectives guide the basic psychological formula of mass media. But it is questionable whether the media help to develop the rational human being. Apparently it is a formula of a pseudo-world (195). The public communication tends to constitute the structure of the group mind. Whatever is not conveyed through public communication tends to be lost to the group awareness. The group mind is so taken up with what is loudly and clearly emphasized, that by contrast whatever is less loudly said escapes group consciousness (196).

Mass media helps to initiate organized social action by "exposing" conditions which are at variance with public sentiment. One might well question the origin of those moralities. A conflict may be exposed between actual objectives and humanitarian ideals both in the individual and in society. Acceptable "motives" are consequently formulated by those who speak within the society--the writers, the "publicists" and the debaters. The cruder drives and vested interests are given a more acceptable appearance and allowed to emerge as the audience's motives (196).

At one time it was hoped that an increase in the range and volume of the formal means of communication would enlarge and animate discussions of basic concern to the public. There is now reason to believe that the media have helped less to enlarge man's awareness of fundamental issues than to transform the public into a set of media-markets (195). Some observers also note the "narcotizing dysfunction of mass media, where exposure to the flood of information with which we are confronted serves to narcotize rather than to energize the average reader or listener" (197).

The principles of mass persuasion by means of mass media have been isolated and listed by Katz (190) and may be instructive to librarian communicators:

1. The message must reach the sense organis of the persons who are to be influenced.

    a. Total stimulus situations are selected or rejected on the basis of an impression of their general characteristics.

    b. The categories employed by a person in characterizing stimulus situations tend to protect him from unwanted changes in his cognitive structure.

2. Having reached the sense organs, the message must be accepted as part of the person's cognitive structure.

    a. Once a given message is received, it will tend to be accepted or rejected on the basis of more general categories to which it appears to belong.

    b. The categories employed by a person in characterizing messages tend to protect him from unwanted changes in his cognitive structure.

    c. When a message is inconsistent with a person's prevailing cognitive structure, it will be rejected, or be distorted so as to fit, or produce changes in the cognitive structure.

3. To induce a given action by mass persuasion, this action must be seen by the person as a path to some goal that he has.

    a. A given action will be accepted as a path to some goal only if the connections fit the person's larger cognitive structure.

    b. The more goals which are seen as attainable by a single path, the more likely it is that a person will take that path.

    c. If an action is seen as not leading to a desired goal or as leading to an undesired end, it will not be chosen.

    d. If an action is seen as leading to a desired goal, it will tend not be be chosen to the extent that easier, cheaper or otherwise more desirable actions are also seen as leading to the same goal.

4. To induce a given action, an appropriate cognitive and motivational system must gain control of the person's behavior at a particular point in time.

a. The more specifically defined and located in time the path of action to a goal (in an accepted motivational structure), the more likely it is that the structure will gain control of behavior.

b. A given motivational structure may be set in control of behavior by placing the person in a situation requiring a decision to take, or not to take, a step of action that is part of the structure.

These principles are essential requirements for the success of any campaign of mass or interpersonal persuasion. Because of the difficulties in meeting all these requirements, campaigns are not likely to make sudden and especially basic changes in the behavior of large numbers of people unless there is an orchestration of the channels of communication. In addition, the changes encouraged should be related as closely as possible to those being promoted by other influences.

As long as the media are not entirely in concert with one another, any individual can play one medium off against another. However it takes a mature person to make comparisons and hence resist what any one medium puts out. Very few people actually do this. People tend to select those media which carry contents with which they already agree. And playing one medium off against another also assumes that the media really have varying contents. It assumes genuine competition, which is not widely true (195).

When a communicator tries to persuade people to adopt his message, he uses arguments and appeals as incentives. The major classes of such incentives include: 1) substantiating arguments, which may lead the audience to judge the conclusions as "true" or "correct"; 2) "positive" appeals, which call attention to the rewards to be gained from acceptance; and 3) "negative" appeals, including fear-arousing contents, which depict the unpleasant consequences of failure to accept the conclusions (198). In fact, these methods stand at variance with the objectives of English composition which aim to promote creative and critical thinking.

These incentives of persuasion or rhetoric as it used to be called are related to basic techniques for increasing the likelihood of a desired response. These techniques are employed with special effectiveness when the reason for action is not clear cut: out-and-out twisting, distorting, or invention of facts; withholding information, distortion of probabilities (199). These incentives build upon and exploit motivational factors; whereas the techniques seek to use them to serve the communicator's purpose. The effects of a communication are found to depend upon the manner in which it is perceived and categorized by the individual. A primary factor influencing the effect of a communication is the relative distance between the stand of the individual and the position advocated in the communication (200).

When an issue occurs toward which the public has not established a strong attitude, the range of acceptance will be broad. Consequently a communication message will have a good chance of being assimilated. But when a position is clearly defined, particularly in the case of extremes, there is a considerable likelihood that the communication will be rejected unless of course, the general public has taken a stand on that issue (200). The greater the discrepancy between the audience's attitude on an issue and the position advocated in the message, the greater the effect of contrast. There is a considerable tendency to evaluate a message as fair or unbiased when it advocates a stand close to that held by the public. Contrariwise, the communication is judged as unfair.

The individual who lacks sufficient information on an issue does not make fine distinctions among various positions. He lumps points of view into large categories which resemble the stimulus characteristics as categorized by the media. An individual confronted with many stimuli tends to form an emotionally toned scale for making distinctions. In effect, the stimulus range is not well graded and the standards for judgments are not explicated in any detail. Both objective standards and gradations in the stimuli may be lacking, but internal factors (the perceived gestalt) and social influences (rules or instructions) contribute to the formation of a judgment scale (200). These rules of the social game may not be any more self-evident to the individual than a general empathy with others.

The individual is more likely to pay attention to the suggestion of a source he has come to regard as an expert or an authority. The source is frequently considered to be a member of the receiver's reference groups. Other individuals and groups are accepted in relation to their distance from the reference group scheme of relationships. Neither the acquisition nor the retention of factual information appears to be affected by the perceived trustworthiness of the source, but changes in opinion are directly related
The library with its open information environment has so far not damaged its credibility with the general public.

Given the nature of opinion formation, there is an interesting possibility for producing change through communication. The communicator could present a position which differs only slightly from the individual's own position. Consequently it might fall within the limits of the receiver's acceptance or even within a noncommittal area. Another device which can be used by the communicator is to compare the position advocated with an even more extreme position. This makes the difference between the sender's position and that held by the recipient appear smaller.

Information Storage, Transmission and Retrieval:

It is tempting to relegate library science to the limbo of any serious intellectual or even communicative endeavor for that matter. Indeed, a whole new profession, information science, has come into existence recently based on the assumption that librarians are documentalists and that the new professionals are informatologists. Without enjoining either in the controversy, it is important to note that neither claim any major active role in communication.

The function of the library and information science profession is to organize and codify knowledge for effective retrieval. This serves indeed a very serious and fundamental objective in society. If this library function were not performed, society would have a much more difficult time in preventing large numbers of its members from slipping back into entropy. As it is the current concern over "law and order" would indicate some preoccupation with unstable subsystems.

The library function is concerned with the preservation and organization of all knowledge for rapid access and retrieval. This traditional library function is the major order-producing control device without which the social order would be seriously handicapped. There is a direct relation between the sophistication and complexity of a civilization and the library function network upon which it is built.

Information storage, retrieval and transfer (however important and significant to the welfare of society) is based on a model of communication that presupposes a high degree of motivation on the part of the patron. It is designed to serve the type of individual which Barnouw (193) calls the focused receiver and which Houle (14) describes as the continuing self learner. Those individuals and groups who seek out the library are usually the "cultural elite" and the opinion leaders whose personal influence in the communication process Katz (70) has analyzed.

Indeed it was this observation in Leigh's (71) general report of the Public Library Inquiry which so pleased librarianship and which has been its "achilles heel" ever since. In fact, it is disenchanting to find that even as recently as the President's

Commission on Libraries (65) librarians still limit themselves to what may be professionally appropriate information transfer but it is hardly a communicative role.

It is not the purpose here to critize the librarian's "traditional" role but only to consider it in context. Unless the librarian performs this role, the social endeavor suffers. It makes little sense to complain that libraries are highly organized and difficult for the uniniated to use. Society must have an organized record of knowledge and this record must be organized in the same way that knowledge was developed: logically and deductively.

Since no library can be organized to suit the ideosyncracies of each user, librarians have always maintained a public service staff to promote more effective interface between the user and the file. The general function of this communicative professional staff is to help patrons overcome the limitations of classification regardless of whatever "notation" is employed, be it in code, descriptor or reference form. This interface however has unfortunately seldom if ever, been considered as a communicative endeavor. The role of the librarian has more often been viewed as an interactive mode between user demands and a logico-deductive system somewhat analogous to the mapping relationship which exists among "natural" computer languages, compiler language and the logico-deductive machine itself.

Since librarians do not engage in communicative activity, some proposal must of necessity be advanced that is compatable with "the library's faith and objectives." Specifically, the point of contact is the document. Every document encompases a message, or discourse unit, that is the product of an absentee communicator. However, the absentee sender has employed certain conventions in designing his message. In the case of verbal behavior, composition convention will employ the symbol and syndesis of language. In the case of nonverbal behavior, audiovisual composition will employ the sign and the "infuriating" juxtaposition of actuality.

In any event, message design is the process which causes perception in another person(s), by stimulating his senses with objects, signs and symbols. As a result of the perception which he has "rigged", the sender hopes that the message designed will become meaningful for the receiver and that he will make some changes in his cognitive structure, his value system and his repertory of skills.

There is nothing particularly new about the essential elements in the communication process. Even John Locke (201) was reformulating an old understanding when he said, "the mind does these three things: first, it chooses a certain number (of perceptions); secondly, it gives them connexion and makes them into one idea; thirdly, it ties them together by a name." The purpose of this process in forming complex ideas which is the essence of language is to facilitate communication over distance and time (i.e. timebinding).

Objects as distinct from signs and symbols ensure direct communication. Objects can be perceived by all the senses directly. But objects are cumbersome when communication occurs over distance and time. Language, using signs and symbols overcomes this difficulty and facilitates communication. However, the signs and especially the symbols of language raise ambiguities unless the referrent (object) and the context (situation) are also present. Locke also noted this difficulty with language, and pointed out that communication based on ideas could lead to confusion. Ideas remain a product of the mind even though they may have referrents in the real existence of things.

Historically, writing made it possible for men to remember more complex thought sequences than was ever possible with spoken language. Eventually, libraries encouraged the development of logic by making it possible to compare one discourse unit with another. However, objects do not exist in libraries. Only signs and symbol exist in libraries. Signs and symbols are stored most often in libraries in frozen (i.e. written) language. It is very seldom that libraries store signs and symbols in visual language and spoken language. A person using most libraries must have a great deal of experience with frozen language which is highly logical and more compressed than visual or audio language.

The library may be a storehouse of ideas, symbols or concepts, and for those who do read well there is no better source than libraries. To read with flexibility and ease is not a universal skill among people, even American people. Studies have shown that maturity in reading remains a distant if not unattainable goal for the majority. Consequently, for many people, libraries are frightening and forbidding places.

The purpose of library communication services is to facilitate the use of information in people's lives by releasing knowledge from the vise-like grip of logic and symbol. In general this is done in two ways: 1) lowering the level of abstraction, and 2) relaxing the formality of the context within which information is sought. The first way of facilitating use of information is to lower the level of abstraction. The level of abstraction is lowered by increasing the range of messages in both audio language and visual language. These audio-visual records are placed in juxtaposition with the written record whose complement they are. For example, each Dewey class of books should have its complement of audio-visual records in immediate juxtaposition on the shelves.

Lowering the level of abstraction helps those individuals who have enough experience with signs and symbols in some area of knowledge and who are able to browse on their own. Media studies help librarians develop messages which have more inductive content. Audio-visual messages are composed by inductive logic rather than the highly deductive logic of written composition which undergraduate students learn in freshman composition. It remains an aim of the media profession to have courses in audio-visual composition at the undergraduate level and which parallel written composition.

But since the library cannot store objects (i.e. referents for signs and symbols) nor even many audio-visual records, many individuals need help in establishing a relationship between the signs and symbols of their unique experience and the signs and symbols of the culture. Librarians need to know audio-visual composition in order to help patrons who are not able to talk about felt needs. Once the patron creates a visual and/or audio composition on his own, about his felt but unverbalized needs, it is much easier for him and the librarian to explore his area of concern.

The second way of facilitating use of information by a wider range of people is to relax the formality of the logical context within which information surprise is sought. Instead of expecting the patron to know what he wants, or of pushing a book at him almost as soon as he opens his mouth, the librarian is prepared to listen and to observe. This practice is designed to create a climate which encourages the patron to express himself and in the process develop his cognitive flexibility.

Listening and observation are practiced by the librarian in three contexts: dyad, group and community. Various methods and techniques are employed to facilitate communication and are known as counseling, group dynamics and community development. In essence, the librarian constantly demonstrates his skills of listening and viewing or observation. Hopefully, the patron will learn from the librarian's demonstration in order to improve his own listening and viewing skills. More realistically, it is expected that the patron will be able to develop appropriate concepts for his felt needs, which in turn will expedite the retrieval and use of materials.

Librarians promote the use of materials so that patrons will listen, view and read better, and be more successful in their daily lives. The "activity books" of Fargo (202) serve as a prototype method to meet the therapeutic purposes of librarianship.

This is equivalent to saying that librarians encourage better intrapersonal as well as interpersonal communication. Librarians are mature in their practice of the skills of listening, viewing and reading, and they are experts in solving their own and others' problems with information.

Adoptive Control Organism:

Since no one so far has been able to observe what happens within the mind of a living human being, a model of the process is constructed on the basis of what happens as the five senses are stimulated in various ways. Sight and sound appear to obtain the best results in discriminatory power and in the range and variety of concepts developed (203). Taste, touch, smell have a more limited channel capacity for transmitting information. Consequently, viewing, listening and reading appear to be the major intrapersonal communication skills, supplemented by taste, tough and smell which help to enhance the unit of experience if not the unit of information.

In communication science, the human being is known as an adaptive control organism. In the adaptive control organism, communication is the process whereby knowledges, attitudes and skills are changed by information modulations. An information modulation is the effect of a sense stimulus on an adaptive control organism. The senses are stimulated by objects, signs or symbols which the adaptive control organism perceives when it gives its attention to the stimuli.

Objects exist independent of man in the environment. Signs and symbols are the "mental" product of the adaptive control organism and are manipulated by it through language. Signs and symbols which exist in one person's mind are not the same as objects nor necessarily the same as the signs and symbols which exist in another person's mind. Spoken language is of course a communal store for signs and symbols. But they are stored more effectively in written language and especially in libraries.

The adaptive control organism is an information processing organism which means that it processes stimuli, signs and symbols which are presented to it or which it encounters. The totality of stimuli, signs and symbols which the organism encounters at any moment is called the message system. The number of stimuli, signs and symbols in a message system varies directly with the amount of information. As the variance of the stimuli, signs and symbols increases so also does the amount of information.

In communication research, it is of course important to know whether some change has occured in an adaptive control organism as a result of a communicative experience. If the communication has been effective, there must be some relation between what goes into the adaptive control organism and what comes out. Some correlation is expected between input and output. If measured, some of the output variance can be attributed to message input and the remainder may be attributed to random or chance modifications introduced into the system during transmission or which already exist in the channel (adaptive control organism) as a result of previous communicative experiences. Miller (203) describes this input-output relationship as follows:

> The situation can be described graphically by two partially overlapping circles. Then the left circle can be taken to represent the variance of the input, the right circle the variance of the output, and the overlap the covariance of input and output. I shall speak of the left circle as the amount of input information, the right circle as the amount of output information, and the overlap as the amount of transmitted information (p. 16).

There are, it seems, two major methods of measuring the relationship between input and output. The first major method of measuring the relationship between communicative input and output is the information measure. The information measure appears to be based on discrete random variables which have nominal and possibly ordinal value. Like some of the assumptions underlying non-parametric statistics, the information measure can make comparison possible where results are obtained from different experimental situations. Miller (203) explains it in the following manner:

> The "amount of information" is exactly the same concept that we have talked about for years under the name of "variance." The equations are different, but if we hold tight to the idea that anything that increases the variance also increases the amount of information we cannot go far astray.
>
> The advantages of this new way of talking about variance are simple enough. Variance is always stated in terms of the unit of measurement--inches, pounds, volts, etc.--whereas the amount of information is a dimensionless quantity. Since the information in a discrete statistical distribution does not depend

> upon the unit of measurement, we can extend the concept to situations where we have no metric and we would not ordinarily think of using the variance. And it also enables us to compare results obtained in quite different experimental situations where it would be meaningless to compare variances based on different metrics. So there are some good reasons for adopting the newer concept.
>
> The similarity of variance and amount of information might be explained this way: When we have a large variance, we are very ignorant about what is going to happen. If we are very ignorant, then when we make the observation it gives us a lot of information. On the other hand, if the variance is very small, we know in advance how our observation must come out, so we get little information from making the observation (p. 15-16).

As messages are developed choice is being continuously exercised by the sender and the components of this message system establish the relative frequency of stimuli, signs and symbols. However the recipient of the message is in a state of uncertainty until he has examined the message. The resolution of the uncertainty is the purpose and result of the communication of information. The measure of information used increases with the amount of choice (i.e. the variance) used by the source in message design which is directly related to the amount of uncertainty or entropy in the receiver. This amount of information or entropy is measured not by the variance of the message content but by the logarithm to base two of that variance. Miller (203) continues his explaination:

> One bit of information is the amount of information that we need to make a decision between two equally likely alternatives. If we must decide whether a man is less than six feet tall or more than six feet tall and if we know that the chances are fifty-fifty, then we need one bit of information. Notice that this unit of information does not refer in any way to the unit of length that we use--feet, inches, centimeters, etc. However you measure the man's height, we still need just one bit of information.
>
> Two bits of information enable us to decide among four equally likely alternatives. Three bits

> of information enable us to decide among eight equally likely alternatives. Four bits of information decide among sixteen alternatives, five among thirty-two, and so on. That is to say, if there are thirty-two equally likely alternatives, we must make five successive binary decisions, worth one bit each, before we know which alternative is correct. So the general rule is simple: every time the number of alternatives is increased by a factor of two, one bit of information is added. There are two ways we might increase the amount of input information. We could increase the rate at which we give information to the observer, so that the amount of information per unit time would increase. Or we could ignore the time variable completely and increase the amount of input information by increasing the number of alternative stimuli. In the absolute judgment experiment we are interested in the second altermative. We give the observer as much time as he wants to make his response; we simply increase the number of alternative stimuli among which he must discriminate and look to see where confusions begin to occur. Confusions will appear near the point that we are calling his "channel capacity" (p. 17-18).

In his chapter on "Entropy", Pierce (204) explicates the information measure and its relationship to probability theory. Entropy increases with the number of messages among which the source may choose to send increases, i.e. as the variance increases. In the face of a large amount of variance, the receiver is very ignorant about what is to happen. Therefore the amount of information received is greater. However, even after the message is received the receiver may still remain uncertain as to whether the message received is indeed the message sent. Pierce (204) continues in his **explaination:**

> Prior to receiving a message over an error-free channel, the recipient is uncertain as to what particular message out of many possible messages the sender will actually transmit. The amount of the recipient's uncertainty is the entropy of information rate of the message source, measured in bits per symbol or per second. The recipient's uncertainty as to what message the message source will send is completely resolved if he receives as exact replica of the message transmitted.

> A message may be transmitted by means of positive and negative pulses of current. If a strong enough noise consisting of random positive and negative pulses is added to the signal, a positive signal pulse may be changed into a negative pulse, or a negative signal pulse may be changed into a positive pulse. When such a noisy channel is used to transmit the message, if the sender sends any particular symbol there is some uncertainty as to what symbol will be received by the recipient of the message.
>
> When the recipient receives a message over a noisy channel, he knows what message he has received, but he cannot ordinarily be sure what message was transmitted. Thus, his uncertainty as to what message the sender chose is not completely resolved even on the receipt of a message. The remaining uncertainty depends on the probability that a received symbol will be other than the symbol transmitted.
>
> From the sender's point of view, the uncertainty of the recipient as to the true message is the uncertainty, or entropy, of the message source plus the uncertainty of the recipient as to what message was transmitted when he knows what message was received. The measure which Shannon provides of this latter uncertainty is the equivocation, and he defines the rate of transmission of information as the entropy of the message source less the equivocation (p. 163-64).

The adaptive control organism can be and usually is a noisy channel. Noise occurs as a result of previous communicative experience, as well as the number of stimuli to which he is submitted, but can be overcome through redundancy in message design and through "chunking" or the lumping together of signs and symbols arbitrarily as a code, or cognitively by means of concept extension either intensively or extensively. Pierce continues and describes the general method:

> In order to encode messages for error-free transmission over noisy channels, long sequences of symbols must be lumped together and encoded as one supersymbol. This is the sort of block encoding that we have encountered earlier. Here we are using it for a new purpose. We are not using it to remove the redundancy of the messages produced by a message source. Instead, we are using it to add redundancy to nonredundant messages so that they can be transmitted without error over a noisy channel. Indeed, the whole problem of efficient and

> error-free communication turns out to be that of removing from messages the somewhat inefficient redundancy which they have and then adding redundancy of the right sort in order to allow correction of errors made in transmission.

In human communication, both redundancy and "chunking" are achieved in language discourse units. According to psycholinquistics the basic discourse unit is the sentence. But as MacKay (115) has pointed out, there are other discourse units which upon occasion produce varying degrees of uncertainty in the receiver and presumably yield varying probabilities of information. The utterances and their functions which MacKay discusses include: statement, command, request, question.

The second major method of measuring the relationship between communicative input and output is the method of social science research (205). Social science research appears to be based on the assumption that, given any independent variable, individuals in a group will rank themselves in a "normal" distribution from high to low in their reactions to the independent variable. Researchers in the social sciences have worked to develop metrics based on the nominal, ordinal and interval scales of the physical sciences. The amount of variance is measured on some scale that exhibits or can be made to exhibit the characteristics of continuous random variables as opposed to the discrete random variables which the information measure can determine.

What is measured will vary in any instance. But the methodology is based on the assumption that if the adaptive control organism is sufficiently surprised (e.g. motivated) some behavioral change will occur. A considerable number of measurement scales exist in social science research. But members of the information processing profession remain to be convinced that the behavioral changes measured are the kinds they want to take responsibility for in any communicative activity.

There are a number of assumptions underlying the librarian-patron (whether individual, group or community) interface which need to be raised for research consideration. However until recently no theory of communication existed in the profession which could guide any research design. According to this theory, a **cybernetic theory,** information surprise (or modulation) destroys homeostasis. The displacement destroys equilibrium or congruity between some element in the cognitive map and its visceral referent within the adaptive control organism.

A theoretical statement of this nature is consistent with at least one objective of the information processing profession. Until the patron is helped to specify what he wants it is impossible to conduct an effective retrieval strategy. This is saying in effect that congruence must exist within the adaptive control organism between verbal behavior and the "visceral" referrent. Because no theory existed much previous professional endeavor has sought to establish retrieval relevance in the document rather than in the patron.

Consequently, contextual considerations need to receive some priority before appropriate measurement programs can be developed. Context analysis is communications oriented; whereas content analysis is oriented towards information processing. Content analysis is applied to verbal behavior; while context analysis includes in addition to verbal behavior, nonverbal and visceral behavior. Content analysis investigates congruence or lack of it between the sender's message and intention; whereas context analysis seeks to determine the degree of congruence between the receiver's verbal and visceral behavior.

CONTENT CONTROL

Before content can be analyzed communications messages must be obtained(206). This is not a particularly difficult task. Communication is fundamental and pervasive. The process, manufacture and storage of communication content appears to be as essential to culture and society as the air we breathe. Communication in its many forms both oral and recorded is a symbiotic element of culture and society.

Content may be anything, including oral language and natural phenomena which upon observation appears to have a pattern and which can be analyzed for descriptive or inferential purposes. The usual content of content analysis is concerned with those responses which have been organized into the language of human beings. While a beginning has been made in content analyzing of audio and/or visual response patterns, content analysis in the past has most often been applied to written records by a variety of the social sciences. More recently, the psychology of counseling and therapy have used content analysis principles and methods for improving interview effectiveness.

Whenever someone reads a body of communication content, and then summarizes and interprets what is there, content analysis occurs. People may communicate in situations which involve interpersonal communications, information retrieval, or messages developed for delivery to an audience. Contemporary content analysis is a means for studying all types of communication, its nature, its underlying meanings, its dynamic processes and the people engaged in the act of communication. According to Mitchell (207)content analysis is concerned with the message phase of the three-step communication process: various motives in a sender produce a message that is intended to express these motives for a receiver. The message may be expected to produce various effects upon the designated audience. Some studies, such as readability of materials primarily focus on the effects that messages have upon an audience. But inference content-analysis may be more concerned with making inferences about the relationship between messages and the antecedents or sender producing them.

Content may be considered as an evidence of modulation in, or as the artifact left by, an adaptive control process reacting to input whether sense-perceptive or cause-effect. Men differ in degree from other natural adaptive processes. In addition to response-patterned artifacts, sounds, visuals and behaviors, men have developed the peculiar response of writing. This ability apparently is unique in the cosmos and enables man to record his "beings of reason" for contemporaries and posterity. "Beings of reason" or concepts are evidence of the perceptions that have been modulated by previously interpreted preceptions (awareness) or information and developed into observations and judgements that become elements of sustained discourse units. The discourse unit becomes the message to be analyzed for inferences about the author's intention and audience reactions. The discourse unit may be the dialog of an interview transcript.

In the last few decades the number of recorded communication messages has so increased by an exponential rate that three significant events have occured. The document handling profession of librarianship has recently and rapidly matured into a mojor information processing profession where content analysis for retrieval purposes has rapidly become a major social profession. Another result has been the development of content analysis as a research method which complements other social science methods of investigation. The third event yet to be realized in librarianship is counseling analysis where the major techniques of listening, hypothesizing and responding are used to explore the patron's intentions and meanings, and to analyze the effect of resources upon him.

Evidence of the first development is readily available from even a brief perusal of the chapters on "Content Analysis" in the Annual Review of Information Science where methods are described for use by analysts primarily concerned with content rather than in inferences about the source or the audience (30). Another evidence of this interest in the content of communication is provided by Brian Vickery, who discusses the professional aspects of content analysis in his article on "Analysis of Information." (208).This interest in professional content analysis grows out of a long history of concern for communication content in library science which is the parent discipline of information science.

As for the second development, one contemporary social scientist has described documentary observation as a major observational technique. Maurice Duverger, An Introduction to the Social Science (209) considers documentary observation along with direct extensive observation and direct intensive observation as the three major categories of social science data collection techniques. Obviously in such an organizational scheme content analysis of recorded communication messages occupies a major place in the social science research of the contemporary world.

The third event has as yet had almost no impact upon either library or information science. While librarianship has always condidered itself as being primarily committed to the individual reader there is little awareness of the significance of counseling content analysis for library advisory services. And yet a considerable literature exists indicating extensive research into various dimensions and schools of counseling but in particular into the analysis and significance of the content communicated by a client to a counselor.

Content analysis, whether for professional, research or counseling purposes, usually invokes one of the available models of communication as an explanation of the process which it attempts to analyze. Research content analysis investigates hypotheses about sender intention and audience effect within the framework of logically composed discourse units. Professional content analysis however, investigates the effectiveness of document transformations and reductions within the logic of question analysis.

Counseling content analysis, on the other hand, listens to meaning as it enfolds in the interview. It hypothesizes about client intention and direction, and the applicability of particular communication resources. This third type of content analysis investigates the client's body of experiences which are usually unorganized in an attempt to determine what symbols, if any, may emerge. Once symbolization occurs in the Rogerian(19) sense meaningful contact or interface can be established with some part of the corpus of knowledge. Presumably this initial interface with knowledge is investigated further and leads into the information retrieval type of inquiry investigated in the work of the information scientist.

In the epistemological model proposed by Kuhn, perceptual input detected as a result of a stimulus from the real world of sense experience leads to value selected concepts symbolized internally within the content of the individual and externally results in the development of judgements within the context of language. Questions or uncertainties may develop at any point in the basic epistemological triad, have implications for human intercourse and may be investigated in the appropriate discipline by the scientific inquiry cycle of reliable observation, valid inference, logical message design or reporting. Certainly questions will extend outward through the communications cycle of show, interpret and feedback into the external culture, institution and value systems.

Counseling interactional analysis serves the purpose of the individual who because of a lack of his cognitive environment is unable to satisfactorily move from sense experience to interpreted perception or concept. Interactional content analysis consequently is a significant element in the stance of any interviewer whose purpose is to identify specific patterns of response (i.e. freewheeling speech) that contribute to the purpose of the interview. In a sense, any counseling response to another's unorganized experience is an inferential interpretation of behavior content whether expressed verbally or non-verbally.

Counseling content analysis is used by the interviewer in a transactional manner to help the client develop some cognitive direction in his unorganized every-day experiences. On the other hand, question negotiation for information retrieval, although it may utilize the transactional interview, shifts the function of the interaction from cognitive development to cognitive flexibility. Content labels or descriptors, and abstracts which are products of professional content analysis, are employed by the inquiry negotiator in an attempt to locate through the reductive transformations of indexing those portions of several communications messages relevant to the patron-initiated inquiry.

Inferential Content Analysis:

As defined in the past content analysis has been used to describe research situations where a written or spoken message is analyzed in an attempt to infer the intentions of a source who may not be present. Content analysis is, as its name implies, the analysis of content, for a particular purpose, of the records of human experience and of knowledge i.e., beings of reason in discourse units. Content itself occupies a central position in the communication process and is that body of meanings through symbols (verbal, musical, pictorial, gesture) which makes up communication. Content is the what in the Lasswellian definition of the communication process: "who says what to whom, with what effect."

Content analysis is based on the assumption that a message is representative and indicative of the meaning behind it as intended by the sender and as received by the target audience. Content analysis may consider the message, the sender, or the reaction of the recipient to the message. Berelson (210) delineated the particular purposes for it under four headings: substance and form of content; the producers of content; the audience for content; and the effects of content.

In the recent issue of the Handbook of Social Psychology (211) the following definition appears: "Content analysis is any research technique for making inferences by systematically and objectively identifying specified characteristics within text." Rigorously defined as a research method, content analysis has been used by most of the social sciences. Some such research may not be labeled content analysis but the methodology is similar whether the research delves into "mental content", "personal documents," or "interview transcripts."

Content analysis is one research method within that larger area of social science observation described as documentary analysis by Maurice Duverger(209). Duverger describes the categories of documents of particular and immediate relevance to library and information science, and then locates the technique of content analysis within the quantitative, as opposed to the classical methods of analyzing documents.

The data of content analyses are the signs and symbols which make up the content of communications (letters, books, conversations, paintings, etc.) and are probably as diverse as the human endeavor. The procedures of content analysis aim to be exact and repeatable and include an explicit, organized plan for assembling data. Then the data is quantified and classified in order to measure concepts under study, to examine the data's patterns and interrelationships, and to interpret the findings (212).

Sampling and describing communications content require precise techniques for condensing such content and for relating these analyses to the hypotheses under discussion. Classification of a given body of content is made in terms of a system of categories devised to yield data relevant to specific hypotheses concerning that content. One of the problems in content analysis is to develop sufficient precision in order to make possible the consistent assignment of data to categories and if necessary replication of the study.

During the past decade there has been a renaissance in the use of content analysis for explanatory studies. Recent advances in computer applications indicated by such methods as the "General Inquirer" as used by Stone(213). have profound implications for studies employing content analysis data. As fast as linguistics adds new understanding of the formal structure of language scholars develop new measurement devices specifically for content analyses, as indicated by Osgood(214) and North(215). Robert Mitchell has surveyed developments such as these and has discussed the relation of them to new methodologies (207).

> "These various measurements, research, and computer developments are slowly leading to a reconsideration of the possible uses of content-analysis procedures. Whereas Berelson was able to define content analysis accurately as 'a research technique for the objective, systematic, and quantitative description of the manifest content of communication,' today there is a growing interest in using these research techniques for producing data that will permit the analyst to make inferences about the latent or underlying meaning of messages and for explanatory rather than only for descriptive purposes."

There are in general two major methods of research content analysis: quantitative (or descriptive) and inferential, a method which is of relatively recent origin. For example, in news reporting, the quantitative measurement of value judgements made by a reporter may indicate the extent to which the reporter was influenced by any particular point of view. However, such analysis does not indicate what viewpoints there may have been. To identify the viewpoint, categories would have to be established in order to classify the reporter's value judgements on a scale of the viewpoints that are involved in the issue under discussion.

The genesis of content analysis occured in the early 1920's with the analysis of newspaper messages and reached a heyday in the 1940's with the work of Berelson (210) Lassell and Leites (216), Smythe (217), and Wolfenstein and Leites (218). The first standard codification in the field was Bernard Berelson's Content Analysis (210). Berelson's study remained the standard treatise on the subject until well after the current interest in content analysis which emerged after the mid 1950's. Symbolic of the changed emphasis in content analysis was the Work Converence on Content Analysis Trends in Content Analysis (219) sponsored by the Committee on Linguistics and Psychology of the Social Science Research Council. Another conference occured in the summer of 1968 at the University of Pennsylvania (220) which advanced the state of the art in content analysis. Since the mid 1950's works in this area have appeared with increasing frequency. Among recent works, those by Budd (221) and by North (215) may serve as a profitable start for the reader and he is referred to works such as these for explicit directions in developing a content analysis study of his own.

Discipline and research oriented content analysis looms as a large endeavor for the development of new findings in the social sciences. Content analysis would not be nearly as significant a research endeavor were meaning transfer a simple matter. But the questions of intention in the message source, the impact effect on the feedback from the target receiver, and the influence of contextual situations are all questions about concerns that are rarely if ever made explicit by any communicator. Were these considerations explicit, discipline-oriented content analysis for research purposes might well be a trivial matter.

Projects which employ content analysis as a research method usually center on the message produced by the communicator. However, their purpose is to find links between the message and other parts of the environment. As Kerlinger (222)points out, analysis is not concerned primarily with the message but with the larger questions implied by it about the process and effects of the communication. "Instead of observing people's behavior directly, or asking them to respond to scales, or interviewing them, the investigator takes the communications that people have produced and asks questions of the communications."

Content analysis attempts to probe into the significant interests and disposition of the speaker or writer involved as he is in a web of overt and latent levels of meaning. Such analyses rest on the assumption that socio-economic and cultural values are institutionalized in various social segments and, upon analysis, become evident in the communication messages of senders living in such situations. Categories are constructed for the words which, according to the particular guiding theory, accounts for variant dispositions and interests and are systematically and objectively applied in a replicable procedure within the text until the guiding hypothesis is tested.

Presented as such, content analysis is a research tool used in making inferences. The factors measured depend upon the theory being investigated. Inference consequently is an important element of content analysis research and properly differentiates it from many related fields where the description of content is the primary objective, such as is the case as in library and information science. A first essential step in content analysis is to decide exactly what must be found out about the material under study. Probably there are an infinite number of purposes for content analysis but these must be specified for any one particular study as the methods are determined by the purpose.

Once purposes have been determined it is necessary to set up the classification, or categories which are subject headings or descriptors of the different types of content under study. The content is generally composed of factual observations and valuative or interpretive judgements. The scope and kind of categories depend upon the nature of the communication being studied as well as the objectives for the analysis. These categories must be defined accurately and objectively so that in the third phase of the study the assignment of content will be consistent among analyzers.

Measurement is an essential element in competent content analysis. As indicated by Riley and Stoll(223) the content analyst uses data to measure concepts rather than describe them in discursive language. "His data consists of certain concrete communications of certain concrete individuals (the *cases*). His conceptual model contains corresponding definitions of particular types of orientations, actions or characteristics (the *properties*) of particular types of persons or collectivities. What he does, in effect, is to treat the sense data (written or spoken words), the gestures or pictures which he observes as manifestations or indicants of these properties (the ideas which he holds in his mind). Measurement is defined here then as the classification of cases (persons,groups) in terms of a given property, according to some rules for selecting and combining appropriate communications data as indicants."

With content analysis as a tool, the researcher can observe communications messages at times and places of his own choosing, and his fears can be allayed that attention caused by the observation will not bias the communication. The researcher stands aside objectively, not as part of the communications process but employs analytic tools to dissect the communications situation. His findings can give a detailed account of the communications and upon them can be based predictions about the source and hopefully the receiver. Mitchell indicates the advantages of using recorded messages for content analysis:

> "An increasing number of social scientists are expressing an interest in conducting systematic quantitative studies of topics for which very few reliable quantitative data have been hitherto available. Scholars who wish to employ modern concepts and theories in studying contemporary closed societies, such as Communist China, or historical periods for other societies, such as eighteenth-century America, have a need for systematic objective data, the kind that content-analysis procedures may be able to provide. Even in studies where systematic personal interview data are available, it may be advisable for the researcher to acquire additional kinds of data by different techniques from independent sources. These data permit the researcher to verify his central hypotheses independently." (207)

Using materials that already exist the researcher can avoid such time consuming activities as preliminary field work, experimentation and document commissioning. Historical materials extend research capacity into the past; and cross-cultural materials make research over extensive areas feasible. Other materials such as letters or diaries deepen insights into intimate feelings and personal relationships.

So far, content analysis has been employed almost exclusively for the analysis of messages into the mono-channel of linguistic phenomon. Very little analysis has been done in iconic channels. A noticeable exception has been the survey report of Donald Auster, "Content Analysis in A-V Communication Research," (224) who suggests pertinent applications and provides a short bibliography. Among ways in which content analysis may be applied to audio visual materials, the following were discussed: 1) describe trends and content of educational audiovisuals; 2) understand the effect of audiovisuals in behavior; 3) analyze the audiovisual production process; and 4) measure the "readability" of audiovisual materials.

Since content analysis of films has been limited to the quantification of thermatic content certering around plot line and characterization, temporal and spatial organizational considerations have been neglected. Byrne(225) describes a method for overcoming this limitation: a frame-by-frame shot analysis of such categories as directed action, directed use of camera, frame composition, decor, lighting and editing techniques. Such minutely detailed and accurate analyses of actual content will help to offset the deceptive and subjective impressions of much film reviewing and criticism.

Six stages have been delineated by Richard Budd(221) in research studies involving content analysis as method. These stages are substantially those of other writers on the topic. "First, the investigator formulates the research question, theory and hypotheses. Second, he selects a sample and defines categories. Third, he reads (or listens to,or watches) and codes the content according to objective rules. Fourth, he may scale items or in some other way arrive at scores. Next, if other factors are included in the study, he compares these scores with measurements of the other variables. And finally, he interprets the findings according to appropriate concepts or theories."

In comparison with other social science research methods content analysis deals with the symbols which constitute communications messages (books, paintings, private correspondence, articles, therapy transcripts). Its procedures aim to be exact and repeatable and eliminate the bias which may result from the conclusions of a single investigator. In these instances, content analysis differs from the work of the historian or literary critic who also deals with the verbal or other symbols which make up communications content. However, content analysis has been formally used in such disciplines as anthropology, education, history, literature, philosophy, group dynamics, reading studies, psychiatry, psychology, and sociology, and less formally in almost every field that is concerned with the records of man's experience and scientific endeavor.

The recurrent weakness of content analysis has been in the area of interpretation because of the lack of a comprehensive, or even clearly identifiable theory of communication. Berelson (210) was able to identify only one theory, that of the Lasswellian model of the purposive one-way communication intended to influence a mass audience. The picture has improved to the extent that today there are a number of alternative theories (situation-oriented, if you will), but few attempts have been made to integrate these into a general model.

Another weakness sometimes mentioned in regard to content analysis is that data must be used that was not specifically assembled for its purposes. Data may come to the researcher in a form difficult to understand and may not precisely fit the definitions and concepts being investigated. Materials are often incomplete and the data may lack reliability or validity. Data, for example, about an isolated historical event cannot be checked for comparison, nor is data from different socio-temporal contexts directly comparable.

Content analyses usually must be supplemented by other observational techniques. Other approaches are used which focus more widely on the several aspects of the communication process. Greater interest has developed in understanding the context of communication, and in the social matrix in which interaction occurs because of the increased emphasis on studying communicative functions as distinct from structural considerations. Context analysis will, for example, help to check out the presumed appeals of advertising against audience responses by focusing more directly upon the encoding-decoding functional process than upon the structural elements of sender-message-receiver.

Descriptive Content Analysis:

Content analysis is certainly not foreign to library science, indeed analyses of content in some form or another constitutes an integral element in the librarian's daily professional work. Content analysis is a central concern of both the library and information processing professions. Without content and its analysis there would be no selection, nor subject analysis, little information retrieval and transfer, or reader services. Content itself is the very staff of the library's collection. The collection, and its contents, is an essential link in the chain of events which relates library communicator to receiver. Attention to this particular link in the communications cycle consumes a considerable proportion of the librarian's professional time.

The administrative use of content analysis is indicated in one study where it was used to analyse employee newsletters and staff bulletins which circulated as in-house communications vehicles. Both quantitative and qualitative analyses were employed in an attempt to increase employee participation and to lay a basis for change in a constantly dynamic organization. Cleland (226) seems to imply that the analysis of content can be an effective instrument for administrative purposes.

By revealing the probable intent of the sender or the possible effect upon receiver, content analysis can provide a more accurate and reliable description of communication messages. Content analysis research exists almost in symbiotic relationship with audience research. A basic relationship is presumed to exist between a communications' message and the characteristics of those who produce it as is evident in most administrative situations. Concerns such as these are of particular importance when considered in relation to the social responsibility of the librarian. Identification of intent by analyzing content helps the librarian represent disparate viewpoints in the collection. Many additional points of view may be helped to find expression in the community who do not now have access to channels of communications.

Brian Vickery in his article "Analysis of Information" (208), discusses the librarian's variant of content analysis, i.e., subject analysis. As described by Vickery two phases occur in the operation: the text is scanned to select words which represent content; and then a decision is made as to which words are relevant to users. It is of course, a formidable enterprise to scan whole texts and select information labels likely to interest particular user groups. Each interest which produces content for communication purposes represents a viewpoint from which subject analyses can be made.

Professional content analysis looms as a large and ever-growing enterprise in the information transfer endeavors of contemporary society. In the words of Allen Kent(227) professional content analysis would be trivial: "(a) if each event impinging on the consciousness of any human beings would result in identical streams of observations; (b) if each observer would use identical words in identical configurations to describe each such single event; and (c) if each human being interested in learning of the event would phrase questions using identical terminology."

Professional content analysis is concerned with the transfer and use of information as requested by an individual who interrogates a store of documents. He wants to receive such information (selected from various senders) as will determine to his satisfaction some anticipated personal form of activity or cognitive state of affairs. The interrogating organism has a readiness to respond. The information obtained and judged to be relevant determines the form of activity or state of affairs which occurs.

Information impact affects the interrogation receiver in some choice to be made or in some other way, and the extent to which the receiver is affected depends upon the amount of information obtained from any one message unit or any combination of message units. There is obviously a difference of kind and/or degree between the inquiry-initiating status of an interrogating organism and the goal-state to which he aspires. Information is sought, analyzed and used in relation to the degree to which the interrogating organism moves from an initiating or interrogating status towards a desired solution situation(228).

In his work the professional content analyst is constantly preparing for communications situations in which a receiver initiates contact with the source(s) and as such reverses a significant aspect of the usual model of communications relationship between sender and receiver. In the usual traditional models of communication the sender transmits a message through a channel perhaps to one person as receiver but most often, unless the message is strictly a private affair between intimates, transmission occurs in a one-to-many relationship, and if Northrop's position is to be accepted, it is a rigorously hierarchial format (229). In the instance where a source sends a message to an audience composed of many individuals, research content analysis, as distinct from professional indexing, is used to investigate the intentions of the sender and audience effects.

On the other hand, communication retrieval systems provide, on demand with maximum precision, information relevant to questions posed by individuals. In this receiver initiated communication there is a one-to-many mapping in a direction opposite to that of the more familiar communications sender system. The receiver interrogates many sources, some or all of whom presumably could yield the necessary information. However in most instances, the interrogator does not use the entire message of any one sender and he may not find his desired information in any one source but only as a product of all sources consulted. This model of communication has a considerably different pattern from that of the traditional sender-receiver model. This model is concerned with question coding when working with a patron and message coding when indexing documents in preparation for service to patrons seeking information.

Questions are formulated according to the way each individual has of preceiving nature and as a result the receiver responses to questions may not always be relevant. Questions result from fundamental hypotheses in the requestor's thinking and shift from one hypotheses to another as perceptions continue to occur. The initiation of communication, or interrogation as it is usually called, by a person approaching an information retrieval system is based upon verbalizations peculiar to his own thinking. The problem then occurs when it becomes necessary to design a retrieval communication system that can be triggered into operation by the verbalizations of requestors rather than by the authors of communications messages stored in the system.

Information science uses content analysis for its potential ability to promote (230)and control knowledge growth and development, as well as for the transfer of information based on retrieval strategies and indexing efficacy. Information science endeavors to organize the connotative and denotative aspects of language. But the former aspect remains a formidable problem in any efforts to formalize natural language, and formalized it must be, at least to some extent so that retrieval reliability is predictable. Denotative reduction, on the other hand, as in an indicative abstract, can be treated by more logical methods but, of course, does not include the connotative reduction or informative abstract of the source's intentions about his subject.

Presumably this difficulty could be overcome by cooperative endeavor between the information scientist and the research-oriented content analyst. Indicative abstracts indicate what the documents are about and consequently have the same purpose as indexing. The informative abstract on the other hand summarizes not the subject, but what the document says about its subject and as such would appear to introduce inappropriate elements into indexing languages and schemes for retrieval purposes.

In information science indexing languages serve as the major method for subject description and to a more limited extent subject control. Indexing provides a common ground or code between indexer and searcher. Indexing language makes it possible to format the content of both documents and search prescriptions and thus secure a maximum matching of the two in retrieval operations. There is a considerable literature on the construction and use indexing languages, in addition to automated indexing and classification.

Content analysis is used to develop labels whose predictability for obtaining requisite information can be measured with some degree of precision. Phyllis Baxendale (231) points out that indexing develops and fixes the "specification of the content of some descriptive labels by laxicon and/or rule." Content analysis is thus antecedent to the assignment of any descriptive lables to the document. It is related to the perennial problems of materials selection and materials subject analysis. The end result of the seclection and analysis process is to label the content of documents in such a way that informative statements may be generated in response to questions posed at the file by patrons.

Where inference is not rigorously based upon theory, the content, of course, may still be analyzed, but the resulting "inferences" are little more than a reformulation in other terms of the content being analyzed. This point has been forcibly made by Philip Stone (213) "Considered apart from the emphasis on research design and inference, the content analysis process is basically the task of applying descriptions, that is of making a particular many-to-one mapping of the text. Viewed this way, it does not differ from any cataloging or concordancing activity."

Stone goes on to point out that the index to a book or the making of a catalog may reflect theoretical considerations, and may indeed be concerned with meaning. But such an operations use of content analysis techniques does not attempt to make inferences based on a study of the recorded message as to the orientation and concerns of speakeror writer. The definition thus presented is useful "in distinguishing between the relatively small amount of content analysis research and the large amounts of cataloging done every day."

Content analysis as well as audience research are basic methods for understanding and solving library problems. Audience studies consider not merely the size and geography of potential and other users but particularly their reactions to the content and the indexing of various types of materials. Lester Asheim (93) makes this point succinctly: "Book selection, the evaluation of reference tools, descriptive cataloging, classification, the writing of annotations for reader guidance, the selection of newspapers for clipping all of these and many more standard library procedures are based on a more or less intensive analysis of the content of library materials."

Content analyses used by information processing personnel are of such a nature as will produce a flagging device for document or abstract location. Once the document is located, a more detailed treatment of the indexing topic may be found through the document's table of contents or index. An abstract is an intermediate step. It is an abstractive current awareness service through which busy users may decide whether to consult the index at all or even to pause and read the entire document. The development of classification by "literary warrant," so aptly described by C. D. Needham (232) is a particularly appropriate example of the process. While some work has been done on the predictability of flagging terms (subject headings, descriptors) for information location, this cannot be considered as a research aspect of inferential content analysis. It specifically serves information gathering and literature synthesizing purposes. Such flagging devices may also serve in the browsing process, or the pre-educative (communicative) and pre-scientific foraging operations so essential in laying out one's thoughts about "felt" needs and in symbolizing the "need" so that it can be mapped onto the retrieval system.

There has recently been a considerable growth of work in various aspects of text processing. The contribution of information science to communication has been considerable, but the fact remains that it is preoccupied with textual processing and the logical and descriptive aspects of descriptor development, and not over the broader inferences which relate to human purpose and endeavor. Quite often the stimulus-response framework of behavioristic psychology was employed by information scientists and communications scientists as a systematic theory of human action. The behavioristic stimulus-response framework was recast in terms of information theory and used to support extensive work in indexing and concordance construction. While behaviorism offered a needed framework for interpretation, still these allowed the investigator to be satisfied with a low level of inference.

Content analysis, then, in information science is more akin to language and text processing than to the inference-making concerns of the research worker. Library science is an attempt at a systems approach to knowledge, information processing, and the implications thereof for human endeavor. Subject analysis, subject classification, retrieval and guidance are almost exclusively concerned with labeling meaning for retrieval and consequently suffer from all the limitations, elusiveness and weaknesses of that approach. Content analysis is expressed in subject headings which include hypotheses about use, or transactional meaning, as opposed to descriptors (descriptive of content) and in document location classification which also includes reader interest, or transaction meaning, i.e., how documents are used, not only how content is described. Numerous manuals are available that will provide explicit guidance in doing content analyses for indexing purpose. Those by Needham (232), Kent (233), Vickery (234), summarize the work of others and systemize the analyses to be done in meaningful steps.

Quantitative content analysis includes a considerable proportion of the professional activities of any librarian information specialist as well as many of the social and other researchers who use documentary evidence in their studies. The information processing professions are concerned about such activities as materials selection, subject analysis of documents whether for indexing, subject heading or classification purposes, and retrieval strategies. It is not normally expected that information processing personnel will make any research inferences on such analyses, even though many judgements over selection are made about documents such as author viewpoint, propaganda, treatment bias. However, judgements such as these are in the nature of appraising fidelity of communication, i.e., its clarity and value for communicating a particular message to the reader(s). Selection especially serves the purposes of identifying the nature and extent of filters in the message and clearly is also closely related to language composition, critical and creative exposition.

Despite the great deal of analysis of content which occurs every day in the library, little attention has been given to the research use of it in order to achieve the purposes of a systematic and quantitative discipline. Such use would describe more accurately the status of subject literatures, the new media, and audience publics as well as the changing boundaries among many subject fields. Subsequently it may help determine appropriate departmentalization, expanded document acquisitions, and subject specialization as well as cost analysis studies.

Cross media analysis is an area of pressing concern particularly in determining which subjects and presentations are treated more adequately in books or in other media. Comparisons could proceed in terms of depth of analysis, subletly of interpretation, scope of coverage and additional aspects which may unfold as important. Of equal value and significance is the use of comparative analysis within a single medium. So little is known of the comparative accuracy, completeness, authenticity and reliability of popularizations or digests as compared with the original that it is difficult to guide judgements about the appropriateness of such materials for various types of users. Gerbner (235) identifies the problem in this manner:

> "The problems to be solved require fuller understanding of the types of message systems that tend to be produced under different cultural, institutional, and technological conditions; of the ways in which the composition of message systems tends to structure and weight issues and choices from the interpersonal to the international level; and of the ways in which information is processed, transmitted and integrated into given frameworks of knowledge."

Content analysis can have a disciplinary effect upon the otherwise disparate efforts of the librarian by forcing him "inside" the content in a way that his usual reading and his usual impressionistic analyses do not. The simple frequency-count of quantitative content analysis may open up new aspects of a document which even the habitual book reader might otherwise miss. The comparative analysis of one book with another can reveal recurring patterns which a single reading would not uncover, and when the experience is cumulative it can provide better insight and give additional dimensions to the librarian s own reading experiences.

Cross-media analysis can, of course, investigate such transformations of phenomena that are isomorphic and/or homomorphic. Professional content analysis for content specification and control is largely concerned with homomorphic (reductive) transformations. Content analysis is used to develop descriptive labels whose predictability for obtaining requisite information can be measured with some degree of precisions. The further question as to whether document content can be reconstructed from its descriptor set is as yet a wilderness lacking investigation and research.

Though scarcely more rigorous in investigation isomorphic cross media analysis has received somewhat more attention. Jesse Shera (76) in his work on the social epistemology of knowledge has conceptualized the whole field of bibliography on a level that can more readily be assimilated into communication theory. But this viewpoint apparently relates to the ways in which the same thing may take on different appearances as when a subject or one of its topics can be presented variously in formats such as bibliography, dictionary, handbook, encyclopedia, etc. Each of these tools is conceived in a different conceptual formulation. Gardner Murphy calls this the Spinoza principle of organization (236):

> "Now I conceive of the communication systems as frequently involving this kind of isomorphism. It selects from the welter and flow of the external environment, both physical and social, realities which have their own place in a new system development by the communications theorist. He can play two games, He can do this with materials which are connected with the Spinoza principle, or he can do this with materials which involve the principle of cross-organization."

But there is a distinction between the outer form of appearances and the inner form where differences are brought together in the same conceptual scheme. This cross media analysis is a matter of cross-organization where linkages are developed between message systems composed of different kinds of phenomena. This process is indicative of the symbolizing and systemizing process that is represented by the Kuhn epistemotogical triad. Murphy calls these cross-media representatives a pattern-for-pattern transformation (236):

> "This view of cross-organization attempts to find an important place for the doctrine of isomorphism, particularly that type of isomorphism which stresses the fact that the formal pattern existing in the external world may register itself upon our brains, so that quite literally the same geometry may appear in the visual field and in the visual brain functions. One is not so much the duplicate or carbon copy of the other, as simply a manifestation of the same thing. There is a pattern-for-pattern isomorphism."

Counseling Content Analysis:

Interpersonal communication is pervasive, and fundamental to all human activity. It is essential to primary group experience, such as the family and reference groups, and constitutes the bulk of important communications on the community level. Of the various levels of communication, interpersonal communication is least dependent upon writing and other technological extensions of communication. The application of extensive technology would seriously disrupt its purpose and function. The function of interpersonal communication is to integrate the human organism, intrapersonally and interpersonally. Technology on the other hand functions to send messages through time and space (237).

Intrapersonal communication on the other hand is based within an individual human organism. The human organism is a communication system unto itself and does not require a speaker, message, or a listener in the sense these terms are used in formal communication. However, reading, viewing and listening are essential skills of intrapersonal communication and integral to the nature of the dialog which takes place within the individual. But as the human organism moves from intrapersonal to interpersonal communication the attempt is made to increase the number and consistency of meanings which occur to it about emerging needs and drives, as well as the demands of the physical and social setting (238).

Counseling is a professional form of interpersonal communication whose purpose is to assist the individual human organism to organize unresolved experience and develop symbols with which eventually to interrogate the knowledge store, indexed as it is by the professional content analyst, and possibly to prepare more or less formal communication messages of his own. Since counseling communication is complex and a constantly changing process, audio and video tapings are used to study and refine the counselor-counselee relationship. From such methods more understanding has been gained about the dynamics of interviewing and the role of diagnosis. Diagnosis is a form of content analysis and consists of a succession of hypotheses as to what is taking place in the cognitive or affective domains of the counselee. As changes appear to occur in the counselee, inferences are made by the counselor in an effort to make his responses more pertinent and significant to the ill-formed expressions of need and interest. The relationship between analysis for understanding and the benefits realized from it in the counseling interview is quite close. According to Mitchell, content analysis in counseling can be a data collection technique in the same sense that interviewing, questionnaires, and other observational protocols are data-collection techniques (207).

The main characteristic of the counseling relationship is oral and verbal communication. It differs from ordinary conversation because one person, the counselor, remains professionally objective and circumspect in the amount and nature of his talk. The counselee, on the other hand, may say anything which comes to mind since it is his purpose and sense of direction, or lack of them, which constitute the interview. While the patron assumes an active communicative role, the counselor concentrates on the messages in order to help the patron analyze and interpret them.

The purpose served by the counselor is not simply that of a sounding board. He must listen carefully and develop hypotheses about the patron's poorly articulated purposes, needs and interests. These hypotheses are expressed in the form of statements or questions by the counselor and are under continual modification with feedback from the patron:

> "Depending on his theoretical orientation, the therapist intervenes for a variety of reasons. He may wish to help the patient talk more, become less anxious, obtain insight, become more aware, or change his outlook and behavior. His decision to speak or to remain silent reflects what he believes will contribute to the therapeutic progress. A therapists' replies may be analyzed in terms of the extent of his activity, the focus and form of his response, the ambiguity or specificity of his response, the leading or following quality of his response, and the depth of his interpretation" (79).

Counseling communication is designed to help the patron identify and understand his objectives and needs which are yet but dimly perceived and remain scarcely anything more than vaguely felt. As a result of the hypotheses and analyses continuously being made by the counselor the patron is encouraged to translate unorganized experience into symbols which thus becomes accessible to rational analysis and discourse. At this point the information negotiator can assist the patron to interrogate the indexing file prepared by the information scientist. Simple verbalization, for its own sake on the part of the counselor, is not enough but must be accompanied by an appreciation of the significance of what is being expressed by the client. The counselor in following the patron's remarks must attend to some facets of the discourse and neglect others. He must decide to be silent or to speak, clarify, question or interpret the comments. He must organize and interpret what he hears before statements, in the sense of leading, are made.

In a sense, all responses to statements by others are interpretations based upon a number of finer distinctions or categories. At one time, a simple unidimensional approach was taken to the construction of counseling analysis categories: Porter (239), Snyder (240), Seeman (241). However, today the counseling interview analysis has been largely superseded by a multidimensional system: Danskin (242), Strupp (243). The important point to note in any instance is that categories of content have been used in the analysis of case material. Once used only for the analysis of recorded interviews, the method, and presumably the categories as well, have been carried over into the actual and kinetic interpersonal relationship of counseling.

Obviously, content analysis is at work in the counseling relationship, and because of the fluidity of the relationship it demands considerable research and professional skill. It differs from the ordinary conversational skills used in interpersonal communication in the degree of training that is needed by the counselor and in the on-the-spot expertise of refining hypotheses and in contructing multidimensional categories for analysis.

> "Therapy involves contact between a trained specialist, who provides the setting and structures the relationship, and a second person who initiates interaction exclusively to explore and obtain relief from his emotional problems. Such a relationship is aimed consciously at facilitating change in the person seeking help" (79).

According to the results of one study by Abrams (244), the ability to recognize the structure of a written message is positively correlated with both listening comprehension and reading comprehension. In addition to the recognition of standard sentence patterns, the effective listener notes the pattern of presentation which includes the central idea, subordinate and supporting points, the analysis and the generalization. Librarians have probably always recognized the importance of knowing the skills of communication. But they have not always been aware of them and have not deliberately planned to include continuous improvement in reading, viewing and listening as an imperative instructional element in every advisory counseling communication.

That extended training is needed by the appropriate professional person in counseling content analysis is obvious. But it may not be so obvious why it should be considered in a consideration devoted to library and information science. Of course it is recognized that counseling is beyond the intended scope and purpose of the information science profession and has not yet been realized in librarianship except by default. However, most librarians will claim that their profession is more than reference work and, indeed, includes readers advisory services, even though formal training for it is largely non-existent. Professional librarians have been trained and sent out into service with the exhortation to work with the reader but without any explicit training in interviewing and the content analysis which could lead to constructive readers advisory relationships.

In his survey of communications and readers advisory services, Asheim (93) was particularly critical of the lack of concerted professional endeavor in the areas of content analysis and audience research. Content analysis he maintained, would have a disciplinary effect upon the profession and force "the librarian 'inside' the content in a way that his usual reading and his usual impressionistic analyses do not." The content, to be forced inside of, is of course, that of communication whether recorded or oral, interpersonal or audience-format.

Librarians are aware of readers in the mass and indeed have pioneered many of the studies of the geography of reading. In general, librarians have a good idea of the person who uses libraries. But more work needs to be done in order to identify the patterns of individual continuing self-education. This approach would include intensive case studies of individual readers especially the "sport" or person who does not fit typical patterns. Asheim continues, "An intensive study of the hows and whys in such instances would tell us a great deal more about what leads people to reading, or what deters them from it, than the over-all figures we now have which tell us merely that a person with a college education is more likely, all things being equal, to read more than someone with only a grade school education."

In this survey article, Asheim is reminding librarians that, for all their stated interest in the individual reader, they have shown little real understanding of the individual learning patterns and have conducted little research into the counseling process. Nor have librarians been particularly rigorous in their content analysis of materials and other resources to be used in the counseling process. Consequently it would seem that an extended consideration of counseling content analysis is long overdue in a profession whose purpose is to advise and guide the continuing self-learner through a maze of library resources.

The content of the counseling relationship is the sign-symbol spoken words which, as a result of actions based on his hypotheses, the counselor is able to make significant for the patron. These materials (or words) are composed of gestures, verbal and behavorial, to which the counselor and the patron respond. The content produced by the counselor's hypotheses is immediately adjusted to the patron's interpretations. Feedback is almost simultaneous and foreshortens the usual process in audience-format communications situations where the communicator and his audience are separated spatially and/or temporarily. Consequently, content analysis of the sign-symbol materials in counseling is an on-going analysis of what the patron says in order to test hypotheses of the counselor as to the development of understanding and meaning in the patron.

Listening is at the heart of content analysis in the counseling process. It is upon the basis of his listening analysis that the counselor forms and focuses his response, the ambiguity or specificity of his hypotheses, the leading or following of his questions and the depth of his interpretation. "To be able to listen and to gather information from another person in this other person's own right, without reacting along the lines of one's own problems or experiences, of which one may be reminded perhaps in a disturbing way, is an act of interpersonal exchange which few people are able to practice without special training" (245).

People who hear do not necessarily listen. The skill of listening deeply does not develop naturally. Listening to someone talking cannot be re-done, nor can a speaker be asked to repeat everything he says. Listeners must adjust to the speaker's rate of presentation and frequently oral communication is not as well organized as written communication. The speaker's vocabulary cannot easily be checked against a dictionary. Closer attention is demanded of the listening content analyzer as to "communicator" intentions and"audience" affect than that demanded of the research content analyst or of the information scientist.

Listening appears to be a much more difficult communicative act than speaking, but even so, listening is only a private experience until a reply is made. And upon this reply, its nature and scope, hinges the entire counseling experience for the patron. The counselor's reply simply has to be based upon sound hypotheses about the intended meaning of the patron. For only when the patron recognizes his intended meaning in the counselor's reply is the accuracy of understanding revealed. Then only does the patron's confidence appear to be justified in terms of the counsel and advice given by the librarian.

> "Opportunity and encouragement to speak must be accompanied by motivation to attend to what is being said. This means listening without anticipating, without interfering, without competing, without refuting, and without forcing meanings into

preconceived channels of interpretation. It involves a sensitive, total concentration on what is explicitly stated as well as what is implied by nuances of inflection, phrasing, and movement... It is not enough to listen if one comprehends only in a detached or intellectual way. It appears to be more satisfying and helpful when the listener can participate fully in the experience of the speaker, sharing his assumptions, his values, his motivations--seeing events as he sees them. Only through this kind of imaginative sharing in the phenomenological world of another person can one really sense how events appear to him and how he feels about them" (79).

PROFESSIONAL CONSIDERATIONS

The fundamental matrix of library science is communication, establishing active and continuing communication between the corpus of knowledge or scholarship as Pierce Butler would say and the concerns of men whether on an interpersonal or an audience level of communication. Librarians have always found their objectives in the viewpoint that knowledge is both the measure and the environment of human thought. Lyman Bryson, (An Outline of Knowledge in the Modern World, McGraw-Hill, 1960) has expressed this basic orientation to significant symbols:

> "Human knowledge is not just a jungle of facts; it is a well-ordered structure. But even in an orderly presentation, of course, this knowledge would still be overwhelming if it were presented as a symposium of exhaustive accounts of all its parts. Fortunately for all of us, the specific facts in any area and in any subject are far less important than the basic concepts around which they are arranged. Still more important are the ways of thinking that have led to mastery in so many fields."

Because most formal education is designed primarily to develop the roots of convergent thinking, librarians deliberately try to strengthen the "mental wings" of imaginative, explorative, divergent thinking. The objective is to open the individual's mind to new vistas and to set the mind into motion rather than to fill it with facts. He is encouraged: to accept the challenge of exploring hitherto unexplored subject terrain; to experience the excitement and dangers inherent in pioneering exploration; to tap some of the inner resources of his own mind and intuition.

An orientation to the "great ideas" is essential to an appreciation of the subject fields of knowledge and to their scope, as well as to form a background of understanding of subject publishing, subject analysis and indexing. Convergent thinking involves the traditional abilities to reason logically, to remember facts and rules of procedure, to compute, and to communicate clearly. Generally these characteristics require one's thought processes to converge on one "correct" and fairly definite answer. Divergent thinking, on the other hand, involves moving out in many directions, diverging, probing, wondering, exploring, experimenting, "playing" with ideas. This type of thinking is flexible, open, and adventurous.

A liberal education aims at the cultivation of the intellect, and exists to focus the intellect upon excellence of subject understanding and of expression whether oral or written. The liberally educated person may not, indeed cannot know all knowledge but has developed the skills to turn knowledge into information. Knowledge made kinetic becomes information which is put to use.

The person educating himself for maturity observes that knowledge grows and changes so rapidly that no adult can keep pace with all of it. The only permanently useful learning is to acquire the basic skills of analysis, criticism and judgement appropriate to particular fields and to certain persistent life situations. Since the individual cannot be an expert in all fields, he must command the principles underlying all subject disciplines. But since it is unwise to leave the judging of basic matters in the hands of experts, his liberal education should train him to use the assumptions of experts in judging the work of experts.

The professions, and in particular librarianship, are designed to aid men in the pursuit of this ideal. Professionalism sets in motion a concept of social usefulness. Through a particular socially delegated responsibility the professional person helps fellow citizens to a better awareness of a liberal education and of their responsibility for putting it to use in community betterment.

Librarianship mobilizes the latent energy in individuals to work for and create more resources of knowledge better organized to yield the information needed by an enlightened and productive citizenry. At least, librarianship, taking its place alongside the other professions, has a major contribution to make in helping citizens to use resources effectively.

A person with a liberal education has an appreciation of the principles of knowledge. He may not know all knowledge. He knows enough to evaluate in human decision-making terms the basic assumptions and principles underlying various subject fields. Such a person has the skills of reading, writing and speaking. The liberally educated adult has at least four major learnings. It is difficult to assign such learnings to any particular course or group of readings. But as a result of the educational and maturation process, the individual appreciates good expression, demonstrates systematic thinking, posesses skill in the use of knowledge, and understands society.

Knowledge exists because of the labors of many men in its production, organization and presentation. Knowledge is the sum total of man's culture both as to its scholarship and as to its distribution industry. Pierce Butler indicates that a culture is a mode of living by which a community exploits the possibilities of its environment for humanity:

> "Every culture, from savagery to civilization, has three elements by which it implements its standardized and traditional patterns of behavior and conduct. These are a physical equipment, a social organization and a system of ideas or scholarship." (Scholarship and Civilization, Chicago University, 1944, p.7).

Knowledge as such once it is recorded remains static until it is made kinetic through use. Communication is an element integral to the phenomenon of the use of knowledge in society. Knowledge being used may be considered as information, and the process of making knowledge kinetic is called communication. In becoming kinetic, the parameters of knowledge change. There may be some overlap with information but it must be pointed out that a polarity exists between them in emphasis if not in range.

Communication on a wide scale is fundamental to the way of life in the 20th century. Communication will increase in importance as an effort is made to preserve and expand democratic societies. The world is rapidly becoming a single society with many cultures. It is imperative that every means be sought to maintain effective communication as is evident from the following statement by Brock Chisholm.

> "Many of our significant and productive relationships with other individuals, and between the groups to which we belong, are established and developed in meetings. Many of our most important functions are carried out in meetings. We may see the great number of local, national, and international meetings, (now far more numerous than every before in history) as evidence of, but also as a major mechanism, which has evolved to deal with, our new and far greater degree of interdependence.
>
> "Meetings have begun to replace battlefields as the arenas in which relationships between groups of people are determined. They increasingly represent our frontiers, where growth in understanding of ourselves and of each other, and our consequent ability to cooperate more effectively, can be expected to take place.
>
> "More and more we depend on meetings for giving and acquiring information, for developing understanding, for the definition of differences, and for reaching compromises, decisions, and agreements. The circumstances and conditions of meetings greatly affect any of these processes and may either facilitate or inhibit them; hence their great and increasing importance." (From the preface, Communication or Conflict, by Mary Copes. Association Press, 1960)

Society and industry wait upon the organization of purposes and interests as expressed by individuals and groups in the particular culture. To bring order out of the confusion of purposes and interests, especially in a pluralistic society, it is necessary to organize knowledge and thought and rapidly apply the resulting principles to the problems of contemporary society. Library scholarship, or library science, depends upon several sources for the data of its knowledge. Its social purposes is to keep the gap narrow which always exists between the creation of new knowledge and its application in the affairs of men.

> "The knowledge in a book, as organized by its author, is partly a product of his mind and partly drawn from sources beyond. The thought in which this knowledge is given meaning and life, purpose and interest, is more individually the author's own, though it may indeed be partly, or mostly, reproduced from other thinkers, or quoted from their writings, or even plagarized."
>
> "Knowledge and thought are so inherently related that in language and in literature they are wholly inseparable. Thought is but a linkage of data of knowledge, or of experience. Influences avail most effectually and most beneficially when they flow from the truths of valid thought springing from verified knowledge."
>
> "The educator and the scientist agree that data and subject-matters must be classified; each study and every book must organize its subject-matter. There must be organization of knowledge, thought and purpose. It must be functional, but it must first be structural. It should be as free as possible, but it must be coherent and stable; else our whole scientific and educational undertaking would crumble in confusion."
> Henry E. Bliss, The Organization of Knowledge in Libraries. 2ed. Wilson, 1939 (Chapter I, passim.)

The development of classification systems as a way of establishing order has always been an essential responsibility of the professional librarian. The librarian is daily faced with the task of organizing access to information and in retrieving it to meet the needs of inquirers. The librarian constantly uses his knowledge of classification in creating order in knowledge but also in his interface with the patron. The librarian uses classification to promote order in knowledge codification and liberal education to promote order among individuals.

Patrons seek out librarians in order to gain assistance with the problems they have not only in retrieving necessary information, but especially in making verbal behavior congruent with visceral referrents. The methods librarians use are based on the principles of problem solving as well as classificatory set development as laid down by William Merrill (Code for Classifiers. ALA, 1939). Employing these principles librarians are able to answer questions such as the following:

1. To what sense of order does library science contribute? How does library science help men to become organized and integrated wholes? What is the unique contribution of library science to order?

2. What is the disorder with which library science is concerned? Are the disorders psychological, social, intellectual, or are they disorders of behavioral systems?

3. What is the knowledge of control that librarians need in order to help patrons? What are the problems of social significance that librarians are called upon to solve?

Once questions about order have been answered, then the librarian develops the control documents that will create the methods and communications-producing situations which make it possible for patrons to achieve successful interface with the knowledge which librarians have to diffuse. Statements of purposes, policies and procedures stem from the components of a situations-producing theory of communication.

Purposes include the objectives of the community which are not being met. Policies lay out the general methods whereby all citizens and patrons can be motivated to participate and to learn from the library's public services. Procedures include the techniques used by communications librarians to accomplish their social purpose, and guide the development of roles in the library-community enterprise. Figure 1 indicates the elements of a communications-producing profession which play a role in promoting order.

Knowledge Organization and Distribution:

Fundamental to the librarian's sense of order is the research which goes into the creation and organization of knowledge. Without research, the well-spring of publishing would diminish, if not dry up altogether. The cornerstone of research is the "bench" scientist whether he be an humanist, a social scientist or a physical scientist. Differences may occur among them and these are usually related to content, viewpoint, methodologies. But their main preoccupation is to advance the frontier of knowledge in their particular subject fields.

The "bench" scientist uses the primary literature as much for a reporting device as for keeping up with new developments in his field. The primary literature may be central to his field of concern but is is not his only reporting and communicating device. It shares these roles with that of professional conferences and the "scientific college" or scope of personal direct contacts. The primary literature and contacts among scientists serve mainly as reporting devices and only secondarily as a means of establishing syndetic structures in the field.

Relationships among topics in the field are impossible to ignore and, indeed, are identified by the bench scientist. But the explication and elaboration of these relationships is not considered to be his major responsibility. The elaboration and codification of relationships becomes the concern of the literature scientist who pursues the evidences of syndetic structure. He seeks clues to snythesis and to larger generalizations in the reports of the bench scientist. The literature scientist consumes the primary literature as input, and, for output, produces the survey, the review or the treatise. Such reports are highly technical and often are given to mathematical models and formulae which aid in creating new hypotheses for further research by bench scientists.

If knowledge were to exist for its own sake there would probably be no further treatment. However it would be difficult to think of knowledge without considering applications in technology, in teaching and in the public affairs of men. Consequently a third level of knowledge-treatment occurs. Secondary scholarship seeks to apply the insights of scholarship to the multitudinous problems of everyday life and thus encourage more satisfactory solutions.

The function of secondary scholarship is to so "package" knowledge as will be useful to the serious interests of various groups of people. People need knowledge for information and for problem-solving. Reference form is one method of content "packaging" based upon the common interests of people for information. The textbook answers a specific type of need of those who are preparing as students for entry into a field.

Finally the function of popularization serves the interests of larger and broader groups of people for general information about many different subjects. In its best expression popularization serves to inform, and to provide that rain of information so necessary to live wholesome and productive lives as citizens. In other instances, however, it may pander to the frivolous, or to the biases and even prejudices of those seeking support for their vested interests.

Central to the various functions of the production and distribution of knowledge to the masses is the publisher. At every step of the process it is the publisher who takes the works of human scholarship and places them in the public domain. The publisher, commercial or scholarly, decides which products of authorship shall appear and which shall not. The decision is made on the basis of which statements of knowledge and of experience add to our understanding and our records of human experience. The relations among knowledge generation, production, distribution and maintenance are indicated in Figure 2.

Logical presentation and artistic quality are essential factors in determining what works shall be produced for the public domain. The publisher is concerned with the way people think and the way they record their experiences. In other words, the work produced must be either logical, or artistic, and fit into commonly accepted conventions of thinking and expression. For example, a work may be of religious experience and because of such deeply felt experience it may be emotional and personal. However in order to transmit such experience, the statement of it must be objectified to such an extent as approaches the commonly accepted conventions, or else it remains solipsistic and immature.

A study of the literature of a period reveals how people have thought and recorded their experience. Obviously that which is logical, and that which is artistic vary over periods of time. There may be universal and timeless sets of standards for distinguishing the good from the bad, or the true from the false. However this may be, the universal and the timeless never reveal themselves as such but only in application to the modes and conventions of an epoch of history.

The librarian builds upon the work of the publisher. Since the librarian does not have risk capital at his disposal, he must profit from the publisher's gambling ventures. Unless the librarian understands the theory and practice of publishing he will not be an effective professional in society. Indeed, if constituent need arises he must stand ready himself to undertake publishing ventures.

At other times, he should be able to advise and encourage publishers to place works in the public domain which they would not voluntarily consider.

Freedom of expression in publishing and in selection is a fundamental prerequisite to all mass media of communication. Without such freedom, one could not assume that the products of the publishing industry were representative of a people's thinking and their experiences. In a sense, the librarian is a retrospective "publisher," since to him falls the responsibility of what shall remain in the public domain by storage in collections. Recorded knowledge then is dependent upon the librarian for its preservation and for the ease with which information can be recalled from it.

Public funds are appropriated to libraries, so that collections of material may be selected which are representational and express the thought and experience of a people in each epoch and to preserve the enduring works of lasting value. Such objectives are not all met at once for any one publishing period of society. The representational is called from the here and now of the publishing industry, and might be considered as the raw product out of which more generalized knowledge and experience is distilled, e.g. figure 3.

Eventually works of greater generalization are published about the previous epoch and selected by librarians to sit on library shelves beside the raw product of that epoch. At some later point in time, the raw product may be discarded leaving behind the works of greater generalization, wider appeal and usefulness. Of course, some evidence of the raw product remains stored away somewhere as primary sources for the eventaul reverifying of the "generalizations." This phenomena of cumulation and generalization does not necessarily apply to works of the imagination and artistic creations which by their very nature cannot be abstracted and reduced to more general statements. Of course they can, but to the extent that an attempt at abstraction is made the original work is destroyed and obliterated.

An example may be taken from the literature of World War I. Few if any but the comprehensive and inclusive library collections attempt to give shelf space to all of the personal accounts, the eye witness experiences and the reminescences of participants of that great war. A few, well selected histories of collections of essays are all that now remain on most library shelves of the great flood of materials published during and immediately after that epoch. Trade, subject and library bibliography is of course a record that such a flood of World War I materials did once exist. Library bibliography indicates that a few copies of each item are preserved for all time in the great national research libraries of the world.

Out of the published record (trade bibliography, or inventory control) librarianship builds and maintains two types of materials collections: the complete record (national networks), and the working collection. Selection criteria are not applicable to collections of the complete record. But in working collections, selection criteria are used to satisfy reading needs and interests. No selection criteria are needed in order to preserve the complete published record.

There are at least three distinctly different categories of use actually built into the published record as a result of the decision-making process in publishing. The first of these is the literature of an epoch as it is published for reading, viewing, listening. A literature of a period is the first uninhibited expression (logical and artistic) by the representatives of the people. Representatives of the people (lay or specialist) give logical and artistic expression to the thought and experience common to the contemporary era.

The second category of use is the review of materials. The purpose of reviewing is to criticize, evaluate and generalize about the literature of a period. Reviewing is the first attempt to render-down the literature of a period into more manageable proportions. The reviewing of materials is an area of bibliography to which librarians have made notable contributions, e.g. LIBRARY JOURNAL; ALA BOOKLIST.

The third category of use is the reference concern with the rendered-down proportions of a period's literature. The publishing of reference materials is concerned with abstracting, summary and codification of published knowledge and experience and to an extent is related to subject analysis and control. While publishers and librarians have made significant contributions to reference publishing a great deal remains to be accomplished. Indeed it is in this area that a whole new frontier has been called into being and known as the information sciences.

The knowledge of abstracting, summarization, codification constitute considerations of reference control and publishing which the librarian and the information scientist attempts to supplement through mechanization and automation. All three catagories of use built into the published record run through every subject area of knowledge.

Figure 4 represents a summation of the structure of human knowledge. The diagram follows Haines (246), and Bryson (247) who championed the outline overview of human scholarship; and of course librarians everywhere are daily involved in analyzing, classifying and processing the totality of communicated knowledge. Librarians are adept at promoting a liberal education for all citizens who have the responsibility in the final analysis for examining the assumptions underlying all knowledge generation.

Considerations of subject content are subordinated to the objectives of librarianship: literature and bibliography, e.g. figure 5. Detailed knowledge of the literature is the province of the subject specialists, whereas bibliography and sources are the specialty of the librarian. Bibliography includes in addition to bibliographic apparatus, the theory and practice of criticism, publication and abstracting. This study of reference form has recently been emphasized by special librarians who are daily required to make contributions to the criticism, publication, and abstracting of their subject specialties.

The evaluation of reference form has as its focus the critical and reference value of those products of the publishing industry which attempt an epistemological function in relation to the literature of the people (*i.e.* pertaining to the study of the limits and validity of knowledge.) The function of criticism is epistemological in nature and includes the evaluation of the logic of thinking, and of the artistry in the expressions of experience. In library materials evaluation, the study of criticism is focused upon the general and subject reviewing media. Criteria for validity of reviewing are identified and tested in case studies.

Abstracting is essential to the cataloger and the reference librarian. Without criticism and abstracting, it is impossible to "read" even a small part of the literature in any one subject field. Reference works which are the product of criticism and abstracting reduce the literature to manageable propositions. The appreciation of reference form is not part of the diet of the unsophisticated. Those who wish further reading in this area should ponder Ladheer's SOCIAL FUNCTION OF LIBRARIES. (83)

Bibliography is fundamental to librarianship. Bibliography brings order out of the chaos left by the publishing industry. Bibliography exerts initial inventory control of the total published record. Library descriptive cataloging increases control by adding a descriptive abstract to inventory control. Descriptive bibliography carries the process an additional step and aided by scholarly endeavor pursues the "ideal copy" through variant impressions and editions.

Bibliographic method is the process of recording references to materials. Referenced materials may be recorded in a reading list, inventory bibliography, citation bibliography, descriptive cataloging, or physical and descriptive bibliography. Each of these methods has been developed to meet a different purpose. The traditional model of communication is everywhere prevalent in library and information science. Figure 6 represents the linear, aimsmanship approach of the bibliographer to which Shera (90) is so partial.

The ever increasing publishing output and the diversification of library materials are making an efficient bibliographical control both imperative and difficult. Available bibliographies and library catalogs are not sufficient to meet the needs of the reference department and the researcher. This explains the current upsurge in the organization of regional bibliographic centers and in the publication of union lists and catalogs, indexes and abstracts.

Intensified bibliographical control techniques, usually in special subject areas, are often referred to as documentation. The documentalist both organizes and interprets the material collected in his library, taking advantage of the most up-to data technological advances, particularly in micro-reduction techniques and in electronics. It can be reasonably expected that such devices as television, facsimile transmission and electronic computers may revolutionize library service.

Bibliographic organization is part of the media of communication and is concerned with the organization and control of publication. The function of bibliographical organization is to ensure that documents are adequately published, housed and recorded. The purpose is the efficient identification, selection, and location of these documents.

Originally the term bibliographer referred to a person who wrote or copied a book or manuscript as in the old scriptoria of the Middle Ages. Bibliography now refers to books, whether in printed or written form, as physical and intellectual entities. Any confusion in the use of the term results from its application to a book as both a physical and an intellectual entity.

Formerly, bibliography comprised only printings and manuscripts, and not audio-visual materials. The two principal new means of communication are motion pictures and sound records. Since their form also differs widely from that of the book, it is preferable to put them in two separate lists, one for motion pictures and filmstrips, and another for sound records.

A periodical article does not differ in principle from an independent book or pamphlet. The sole difference is that a group of articles is bound together and published as a serial issue. Articles should therefore be treated in the same way as independent publications. If they seldom are, it is because their number is so overwhelming and the cost of control is consequently high.

Indexes are needed for the general reader. Popular libraries subscribe to a number of periodicals that meet the understanding of a reader without a specialist's background. An index of more important articles in periodicals of this kind may be useful, since all this material, made available through the index, will supply a valuable supplement to books.

Figure 7 indicates a model of an information system which may help in understanding the major elements or functions of library and information science, and in considering the storing and coding of library materials in relationship to the total system. The model of an information system thus displayed has but three main elements (store, code, seeker) and one secondary element to account for the display of the materials content. The exhibited model is a general one to account for information processing by nature as well as by men.

Information processing is much older than mankind. For example, information about the ice age is stored in glacier tracks. The movement of glaciers is effected by temperature and land terrain. But it is only recently that we have learned to interpret such information of past ages, and to draw it out of entropy. We have been anxious to reach the moon and we have learned that information about earlier ages of the universe is stored there. A similar reason motivates exploration of the sea depths.

Another example may be taken from the field of letters. The famous Rosetta Stone was found in Egypt in 1799 by an officer of Napoleon's engineering corps. The stone carried three inscriptions: Egyptian hieroglyphics; demotic (popular Egyptian of the time); Greek script. The Greek could be read. But it was not until a quarter of centrury later that Champollian, a French scholar, was able to decipher the ancient hieroglyphics.

This question of interpretation is of fundamental importance. It is for this reason that one major element of the information model (code or language) is located between the store and the seeker. In an analagous way an index is placed in a book so that the seeker may obtain information from the store (document) without reading through the entire book.

Language was the first of man's inventions for identifying, transmitting and storing information. Language soon became the standard metric. Each man tends to observe and to think like another, because a common language channels intellectual processes along similar lines. Oral language being but a weak storage medium, stories, rituals and "histories" were first developed to offset such attrition.

Written language was man's second great invention for processing information. The supremacy of writing as the major information vehicle has never been challenged. It is language as a coding device that will guide the exposition, the storing and the coding of knowledge so that information may be located in context.

Human Order through Change:

The purpose of knowledge generation is to achieve order through the predictive power of an orderly research procedure. The purpose of communication, on the other hand, is to make the predictive power of knowledge kinetic in the affairs of men. The findings of the sciences are related to the purposes of society, groups and individuals by the various professions. Such normative and prescriptive functions of a communicative profession can be expressed in a set of standards.

1. COMMUNICATIVE STANDARD: Continuous study of needs and concerns of individuals, groups and communities by (a) community study (total community); (b) audience research (reached users of library); (c) market analysis (unreached publics).

Considerations of engery force include motivation to serve, to participate, to communicate and to promote wider use of information in people's lives. Leadership administration is involved with services that will motivate people to participate in information surprise experiences. Media are so orchestrated into a comprehensive communications program as will saturate the community, make it difficult for people to avoid thinking about the issues of concern, and get the "talking chains" going in the community. People generally do want to overcome the limitations of disparate experiences.

Librarians in communication services are involved with methods, or in the creating of new ones, that will motivate persons to learn and to communicate. Communication librarians stationed at the point of first contact with the public, have the ability to work with all ages and interests in at least sufficient depth to make referral to more specialized library and/or community resources. Coordinated library service owns all media of communication, or at least, in smaller systems shares ownership with other agencies of informational or educational communication, in order to meet the agency's method for communication.

Consideration of Client or Patron are based upon such major factors as: concept set classification, models of thinking in the problem-solving process, and audience research or market analysis. Market and audience research identifies interests and concerns, while the models of thinking guide the patron in his interface with the knowledge store.

The requirements of market and audience research are partially met as the functions of a coordinating structure begin to operate. A continuous study of community needs and interests is conducted. Community resources and information services are identified. The community needs, resources and services are made known to the community as a whole. Out-of-community resources are obtained as soon as the need for them is anticipated.

These general methods or policy areas are made more specific in actual interfaces with patrons, whether as individuals or as groups. The scale in this area including nominal and ordinal elements are ranked from high to low:

.continuous study of community needs and interests

.identify community resources

.identify programs and services of all agencies and organizations

.make known community needs, resources and services

.obtain out-of-community resources when needed

2. COMMUNICATIVE STANDARD: Identify and secure community and out-of-Community resources. Resources include all human, printed and audio-visual materials and resources, e.g. (a) recorded and published in the public domain; (b) resource persons, agencies, organizations; (c) present moment awareness - context analysis as source of document subject analysis.

Characteristically most metropolitan areas are rich in information resources, both general and specialized. Major libraries have begun to work together through a network known variously as a regional library center in order to avoid unnecessary duplication of resource collections and to facilitate access both to their own resources and to other libraries in the national network.

There are many libraries, however, in the metropolitan area who have not yet been able to undertake formal membership in the network system. Numerous other information centers exist which function to provide significant services to specialized interests. All of these benefit in varying degrees from the information transfer (bibliographic) network. Each of these, however, have other needs for information that primarily can not be met from documents that stem from the usual publishing and distribution channels.

A good amount of knowledge, particularly that related to the work-a-day life of the people, exists in records and sources that are ephemeral and not highly organized, or perhaps remain unorganized. This type of knowledge is often mission-oriented. Information is retrieved from such sources only so long as there is an obvious and continuing need usually for a limited clientele. So far, libraries with limited support have been able to acquire and store only more structured materials with a greater probable potential for continuing information retrieval.

There is another extensive category of knowledge which does not exist in records at all, but is available only in the minds of specialists and professional experts. This kind of knowledge becomes available only upon consultation. The information is rendered kinetic when the individual interfaces with a counsulting expert over an immediate problem or specific interest. Resource control in such instances includes the identification of consultants and an awareness of the scope and availability of their expertise.

Finally there is the knowledge of the present moment, the near past and the impending future where the emerging needs of the people help to shape the information sources of the present moment. There are several media of communication in metropolis whose knowledge of the present, the near past and the immediate future is a constant and continuous source of information which few citizens in the area could avoid even if they wanted to do so. The general public are largely satisfied with program content in the mass media. However, some specialists need information which anticipates media programing several weeks or possibly months ahead in order to assemble resources that will extend and deepen media impact when it occurs. The specialty of the request requires the exhaustive treatment for which complete bibliographic access is designed to meet.

This type of request while the major preoccupation of present day library service represents, but a fraction of the total information needs of the people in a community. Their requirements are conditioned partially by the media and partially by their daily occupations. Consequently, the information spaces sought range widely over ephemeral and mission-oriented sources of knowledge. Only a small percentage of the information required every day is sought in the depth for which the bibliographic record is designed to serve. Of course, without such inquiry from the record, civilization would flounder for lack of perspective. In the long run, libraries of the record are an integral element of modern vigorous civilizations, even though in the day to day preoccupations of people they often seem irrelevant.

3. COMMUNICATIVE STANDARD: Calendar agency and organization programs, and help improve programs of agencies and organizations, (a) co-sponsor programs in areas of concern where programs are not now under development; (b) survey resource production to identify lacunae in knowledge, and promote research in areas of concern not researched or developed with publishing record.

Many years ago, Asheim (93) analyzed this problem as central to the communication's function of library and information specialists: "for the kinds of problems which the library is best fitted to study, two major approaches are probably most useful: content analysis and audience research." The problems are still unattended and with each passing year become more imperative. Librarians need training in communication services and in the kind of information-access control that is immediately relevant to all people in the community. Consequently, there is a need in most communities and in the metropolitan area especially for indexes to information spaces that exist in ephemeral and mission-oriented sources and materials. Examples of these types of indexed information-spaces include special libraries, information centers, data banks, community and specialized information and resource files.

Many such specialized information processing centers are available in metropolis. But there is a serious lack of coordination. There is no one clearinghouse to which to turn. The discrepancy which exists between need and the mustering of information and of making it kinetic in the affairs of citizens is approaching a crisis. If left unattended, it will be interesting to speculate on the contributory affect of a lack of available information upon the urban disorder of our time. While the members of the library and information profession must have competence in the situation-producing behaviors relevant to effective communication, they must be supported in their endeavor. Some elements of control may exist in prototype but support is understood to be the indexing of information spaces needed by people in such range and depth as will provide the information "surprises" they are seeking.

4. COMMUNICATIVE STANDARD: Make it difficult for all people to avoid thinking about personal, group and community issues. Stimuli need to be presented and repeated through an orchestration of media, so that the social endeavor becomes a community programed for communication and learning.

In the Dyad, professional librarians are needed at point of first contact for all age groups and interests in order to: (a) listen, encourage, stimulate person(s) to think about their problem; (b) label and define the problem or experience: (c) develop synonyms for flexibility; (d) negotiate files for retrieval.

In the Group, it is necessary to develop sequential experiences on a predetermined topic of concern in order to: (a) counsel for group processes; (b) train for leadership and role productivity; (c) respect other viewpoints, and develop ability to handle other value systems "objectively"; (d) transcend negative roles.

In the Community, community study becomes an educational method in order to: (a) saturate awareness and stimulate "surprises" (library ownership of mass media - orchestrated); (b) motivate participation by "needling" the value system(s) of the community; (c) motivate learning by involvement; (d) follow-up by having materials on library premises, or rapid access to them.

At service outlets in the system, professional librarians should be stationed at points of first contact with patrons whether on the premises or out of the community. Librarians should be skilled in interviewing, guidance counseling, group and community work. They should have backgrounds in educational psychology and communications. Their purpose is to make referral to further resources within libraries and elsewhere in the community.

The mere transfer of information materials or transportation of data is not sufficient to meet the interests and concerns of the patron. Knowledge stores and their indexes require a slight shift of emphasis in the general problem-solving model. The search strategy is specified in the requirements for browsing, whether in the card or document file. Browsing in the index requires a more rigorous awareness of classificatory codes than document browsing. Once the indexing labels have led the patron to a space in the document file where information surprise can occur, he may bring a variety of models of thinking to the process of interpretation. The nominal and ordinal elements of general problem-solving as a thinking method include the following:

.identify felt need, or personal problem
.define felt need or problem
.develop a tentative solution
.mentally elaborate solution to identify related topics
.decide upon a solution (hypothesis)
.verify solution through experimentation
.appraise experimental findings and made a decision
.review decision and project to future problems

Considerations of context include two foci of attention: on-premises interface with patrons and the social groupings. On premises, any library in its service routines and building layout is organized as "service in depth." Casual and referral inquiries (i.e. cognitive development) are counseled near the entrance, and research (i.e. congnitive flexibility) is conducted in areas more removed from the entrance. In either instance, staffing is professional with a high degree of proficiency in counseling and retrieval.

Off-premises contexts include various patterns of social grouping revolving around the triad of interpersonal, group and community activity. Such groupings represent the on-going contexts within which services are provided and for which a body of methods and techniques have already been developed by the profession. Scales which have nominal and ordinal value have been suggested by research in other disciplines and indicate the type of interpersonal interface sought by patrons when consulting the communication services of coordinated library service:

.stimulation or encouragement to think through the problem and assess resources for its solution

.obtain recognition and sympathy, and acceptance of his feelings

.opportunity to discuss various aspects of a problem and get information

.advice regarding what action to take

.relief from his problem by discussing other things

In order to realize their objectives and pursue their accomplishments, librarians take advantage of team strength in services staff, both in subject content and group work-specialization. This is facilitated by one network system where state support is available to all types of libraries, both for information acquisition, organization, and transfer as well as for communication services. A coordinating council is made up of a staff representatives from communication services. Communication services combines the various library interfaces with the community, interpersonal, group and community development for all age, educational and socioeconomic levels. All staff have a generalist preparation together with an age and subject specialization. They are recruited for their ability to work on a team and to move from one context interface with flexibility and accomplishment.

5. COMMUNICATIVE STANDARD: Evaluate the communicative effectiveness of library operations. Categories of evaluation serve as the performance categories in a performance budget and may include: (a) new audiences (groups) reached; (b) increased county legislation for social issues; (c) increased (or reallocated) county (area) budget for social issues; (d) increased per capita library income; (e) increase (or effectiveness) in satellite groups; (f) speed of out-of-community access; (g) increase in number and range of out-of-community resources; (h) decrease and lack of censorship problems; (i) overcoming (taking steps) type of library service.

Considerations of goal or terminus devolve around the end point of the activity. Specifically, library science has addressed itself to a sense of order whether personal, social or knowledge oriented. Librarians have a clear apprehension of entropy (the disorder to be overcome), the negative entropy (information) to be achieved, and the professionally appropriate and effective entropy reducing (control devices) systems.

The matrix produced by matching entropy reducing systems with social contexts suggests the taxonomic range of communication situations for which coordinated library service is responsible. This is indicated in figure 8. It is difficult to discuss objectives without at the same time considering evaluation. Areas in which measurement scales for a coordinated system can be developed grow out of the axioms of the discipline. Statements of method or policy describe these relationships or areas (who, what, why, when, where) of interface which the communications staff encourage both in motivating people to participate and to learn.

Considerations of protocol grow out of purpose, policy and procedure in coordinated library service. The system is essentially an information-processing administrative concern where information takes the form of data about objectives, environment and resources. The function of the communications staff is to create relationships, or communication experiences between citizens and the knowledge which coordinated library service has to diffuse e.g. figure 9. There is considerable frustration over a lack of total library service in the community. Given its legal base, public librarians can take leadership for library systems development and coordination which is impossible for other types of librarians. Type of library service, has served its purpose and should be eliminated as soon as possible in favor of information networks and systems development.

Coordinated communication service can be more effective in promoting an interface between the general public and all the information sources in a community, e.g. figure 10. Leadership administration should be concerned about the methods of communication in its various contexts rather than information acquisition, control and transfer which can be turned over to management administration. Management administration should be subordinate to leadership administration, whose major concerns are with market analysis studies and content analysis studies, which findings will be used to establish the specifications for information control devices. The communications staff have ultimate responsibility for all decisions as to information control methods. Basic dichotomy is between information librarians under managerial administration and communications librarians under leadership administration. In other words, professional specialists should have line authority over library operations. Leadership administration is a communicative method, while managerial administration works out a formula to get people to produce.

Communicative Contexts:

Library communication services are based upon a theory of valence. The human adaptive control organism is motivated by self-preservation and self-satisfaction. Whatever he does or can be led to do is related to such basic desires. These visceral needs may be sublimated and rationalized. But since they cannot be completely eliminated some account must be taken of them in communication. Figure 11 indicates the three steps in the cybernetic cycle of the adaptive control organism, while figures 12 and 13 diagram the interviewing and reading ladders' relationships respectively. Figure 14 is a general model of materials considerations in relation to the central issue around which they are selected to promote "reading" development.

The essential elements of the cybernetic model operate in all contexts within which communication occurs. These elements are displayed in figure 15, while in figures 16 and 17 the sequential and developmental processes of the organism are diagramed to show the interaction. Symbolization is at the core of the communication process. The visceral referrent is "sublimated" or "intellectualized" in the counseling process and concepts occur which enlarge the cognitive map of the adaptive control organism. Figure 18 points out relationships between the disequilibrium and the homeostatis sought by the organism. As Ashby (248) has pointed out instability states require a maximum of energy and attention by the adaptive control organism.

An understanding of the symbolizing process and the implications of it is of fundamental significance to the communicative enterprise as Cleary (34) has indicated. Belth (18) (249) has identified and explicated the functions of the symbolizing process not only in considerable detail but in a way that can be immediately appropriated by communicators. The following schema has been adapted from his work:

A. Supportive functions are many and work in many ways, but on the whole they can be divided into three groups:

1. Powers of observation or perception include hearing, seeing, tasting, touching, collecting, identifying, and so on.

2. Sign- or symbol-manipulation operations include the uses of language of all kinds, from the growl of animals, even the movement of less complicated organisms, which provoke countermovement, through reading and writing, speaking, and listening in humans.

3. Instrument skills are developed from the kinds of instruments that a culture makes available, e.g. typewriters, radios, recorders, cameras, microscopes, telescopes, etc.

B. Preservative function or conserving, in the individual who is involved in memory. It serves as a reservoir of the records of the individual's own and others' experiences, and is made increasingly sensitive when summoned in the truth-making process. In creatures below the human level, memory is more clearly bound to action or function, and to instinctual behaviors--all of which contribute to preservation. All of the conserving or preservative processes aid the one basic activity of remembering, a primary function in the operations of communication.

C. Deliberative functions, which would appear to be the heart of the communicative act, are of two types:

> 1. Inference-making includes the recognition and employment of a variety of modes of thinking in which inferring occurs, even that of inventing additional modes.
>
> 2. Test-making and test-performing is indicative of the feedback process based upon specified behavioral objectives.

These three functions which Belth has explicated are common to the purposes for which librarians exploit the materials collection for use by people. There is a difference between collection building and collection exploitation. Collection building and organization have become part of the network design (86), but the principles of selection and subject analysis are still valid for readers advisory work. The box score diagram, figure 19, indicates the relationships between librarian qua librarian, as knowledge organizer, and librarian as a communications agent.

Communications librarians serve as a watchman of the communications environment being planned by the various media, and through notification of the public services make it possible for the librarians to have programs ready and special "mission-oriented" collections assembled, organized and in dexed in order to meet the demand created. The function of this role is continuous, and necessitates a considerable degree in accuracy of prediction in at least two areas of consideration: (1) to identify the areas of interest and concerns; i.e., the content in subject or topical categories, of the media of communication (retrospective analysis is not sufficient; content must be anticipated and advance-awareness be acquired by every indicator possible); (2) to identify and anticipate the intentions of the originators of media programs in order to ensure that other points of view are represented in the programing on the library's media communication networks.

Communication services combine the various library interfaces with the citizen: interpersonal, group and community development for all age, educational and socioeconomic levels. All communications staff have a generalist preparation together with an age and subject specialization. They are recruited for their ability to work on a team and to move from one context or interface to another with flexibility and accomplishment. Communications librarians have near line responsibility over management and certainly over information transfer librarians. Administration is a communicative method for creating situations within which communication can occur. The function of leadership is to use general models of communication which will help to integrate community endeavor (figures 20 and 21.) The following discussion indicates some of the principles in a systems approach to communication:

1. If knowledge exists in sources and materials, then people can use information to reduce personal, social and environmental entropy.

2. Use of information varies positively with its value or or valence to individuals, groups and the community.

3. Willingness to pay is a function and measurement of the effectivensss of communications librarians in motivating: (a) individuals, groups and communities to use information for reducing entropy; (b) subject specialists, researchers and writers to place new knowledge in the public domain where lacunae exist in knowledge and where complete gaps in knowledge would be relevant to the entropy-reducing needs of individuals, groups and communities.

4. Valence of information varies: (a) directly with the competence and availability of communications librarians, and as the fractional ratio in number of communications staff to community constituents approaches unity: (b) directly with the depth and consistency of homorphic transformations of existing knowledge by indexing and abstracting; (c) inversely with the difficulty and time required for retrieval.

5. Availability of communications librarians and the degree and time of access to sources and materials is a function of willingness to pay on the part of individuals, groups and their fellow constituents in the community as a whole.

6. The community public information center (i.e. County Department of Communications) incorporates all types of library service supported by public funds. The administrator is the local counterpart of state and federal library consultants who together coordinate the total resources of state, region and nation and expedite access for community demands.

7. The community public information center's major functions are communicative and educational.

8. Communication librarians provide informal education and total communicative service to individuals directly, through groups and the community.

9. This service permeates the total program of the library and, depending on the rapidity of access to resources, may be carried out by:

    Collecting, organizing and administering materials that meet the educational needs of the community. Informing the community of available materials and communication programs.

    Collecting and organizing information on the informational and educational resources of the community. Publicizing and making easily available such information.

    Devising and sponsoring library activities through which individuals or groups can make effective use of materials and library services--such as counseling and guidance, discussion and action program series, and other sequential programs planned around a topic or theme and organized to give continuity and direction to the educational process.

    Maintaining a working relationship with all other agencies and organizations on community needs, and cooperating with them, when possible, in efforts to create programs to meet these needs.

    Recognizing community needs that the community has not yet identified by itself and, through the imaginative use of resources (personnel, materials, and facilities), stimulating the community to meet these needs.

    Involving citizens with similar interests in learning and action programs designed for maximum participation of all members.

The principles of library service to individuals, groups and the community are closely related. In addition, some methods used in one context (e.g. individuals) may extend into another context (e.g. groups), and have been used by librarians to effect and facilitate communicative transitions. Apparently, the personal and social maturations of the individual patron is increased to the extent that he is encouraged and motivated to participate in the group and the community. On the other hand, interests aroused by the mass media of communication can be extended and indeed deepened only by more effective library service to the individual.

When library communication services are examined with the aid of communications models, their set of principles and methods, the weakest areas of organized professional knowledge is that of library service to the individual, to the group and to the community as well as their interrelationships. The identification of relationships among library services to the individual, to the group, and to the community cannot be overlooked. No library service to the public can exist completely compartmentalized if for no other reason than that any one patron's needs may range over the entire service program. Figures 22, 23 and 24 diagram the relationships which the following points explicate:

1. The historical dimensions of library communication services has generated the principles which support the range and scope of service to individuals, to groups and to communities.

2. The purpose and function of library communication services include the following major elements:

    Agency or institution resources, factors and significant relationships to other agencies.

    Reader, client and patron concerns and interests--potential, realized and latent.

    Social framework--constituents, community realities, situations and conditions.

    Objectives, social responsibility, goals, and rationale for library service.

    Method, procedures, and interface with community groups and individuals.

    Citizen's motivation to participate and to learn--public relations, informal education, information supply and referral center.

3. The functional relationships among communication services to individuals, to groups and to the community have been developed in answer to the following questions:

Service to Individuals: How well are librarians using the models of individual psychology, individual development and interpersonal communication in promoting services for the individual?

What is the librarian's orientation to the patron? Are the needs and values, for which information is sought, determined by the patron and dependent upon his initiative? If so, is the librarian a passive listener?

Is interviewing considered to be a helping relationship in which the patron identifies his own concerns? How does interviewing fit into the general method for helping the patron solve his problem or meet his need?

How are advisory counseling, reference, tutorials and bibliotherapy used as alternative (or in combination) methods for the patron to consider?

How does library counseling relate to therapy (whether bibliotherapy, or audiovisual materials therapy, or browsing therapy)?

At what point in interpersonal communication (between librarian and patron) is reference retrieval called for, and why?

At what point in interpersonal communication is tutorial service, or guidance (e.g. vocational) called for, and why?

Why, how and when does the librarian make referral to resources outside the library?

Compare and contrast "book" selection ("readers advisory work") for the reader with the intrapersonal role-taking values of reading, viewing and listening?

What principles and methods in interpersonal relations are employed by library supervisors to evaluate staff performance and promote effective communication within the library and to the general public who use the libraries? How can the communicative ability of the staff be increased so as to induce a wider range of citizens to use library services?

Services to Groups: How well are librarians using the models of communications, psychodrama and group dynamics in promoting group services?

> What is the librarian's orientation to the group? Are the needs and values, for which information is sought, determined by the group and dependent upon its initiative? If so, is the librarian a passive information retriever?
>
> Are group methods (dynamics and group network theory) the matrix of relationships within which the group identifies its concerns? How are discussion techniques employed as a general method for solving problems and meeting needs?
>
> Compare and contrast the librarian's methods in working with discussion groups vs action groups?
>
> What is the role of volunteers in library public services and their function in satellite groups, such as "Friends of Library"?
>
> How are sensitivity sessions, discussion groups, "Training laymen in the use of the library", lectures, forums, panels used as alternative methods (or in combination) for the group to consider, and why?
>
> For what reasons and how are individuals counseled to participate in groups?
>
> How are groups exposed to information so that communication may occur? Specifically, how is "information" retrieval done for the group?
>
> How are group methods and dynamics related to library personnel administration, and specifically to the rationale and development of continuing inservice training for more effective public services?
>
> What are the problems of communicative effectiveness in library services? What are the principles and methods used to resolve communication problems?

Services to the Community: How well are librarians using the models of community development and mass communication in order to promote community service?

What is the librarian's orientation to the community? Are the needs and values, for which information is sought, determined by the community and dependent upon its initiative? If so, is the librarian but a "bookstore manager" to the community?

What is the relationship of the social myths (edenic and utopian) to the community objectives not being met? How does the librarian exploit the social myths for community betterment through effective library service?

How does the librarian involve the people in concensus-making, and anticipate their decisions while making certain that citizens feel themselves to be in the "drivers seat" of community affairs?

How are the elements of a situation-producing theory of communication (agent, patron, situation, goal, policy, motivation) institutionalized and implemented by the librarian in the community?

Compare and contrast public relations (mass communication) with the communicative role of the library in the community? How are the mass media employed in each instance? What is the relationship of community activity to group and individual activity? How is interpersonal transition effected?

How are socio-drama (games, demonstration, spectacles), knowledge generation (are disciplines led by profession?) and community development (community study) used as alternative methods (or in combinations) for the community to consider, and why?

For what reasons and how are individuals and groups counseled to participate in community activity?

How are communities exposed to information so that communication may occur? Specifically, how is information retrieval done for the community?

Compare and contrast the roles of "objectivity" versus "advocacy" in developing community based library services. What are their historical antecedents in the development of the librarian's profession, and specifically to the library's role as a coordinating structure in the community?

DISORDER	ORDER	COMMUNICATIVE (CONTROL) DEVICES Major Professional Goals
Theory lacunae Research lacunae	Promote theory construction, research, publishing and compendia writing in: Sciences Social Sciences Humanities	Theorem 1: Acquire one copy of everything placed in the public domain. Theorem 2: Organize documents for recall and information retrieval. Bibliographic control Networks and systems
Personal lack of education	Promote education: elementary, secondary, college, liberal education. Promote consultation. Promote reference.	Theorem 3: Promote use of information in people's lives. Group work services Individual services Advisory counseling Reference retrieval
Social disorder	Promote social order, institutions, agencies, organizations, informal groups. Motivate to participate through the mass and other media.	Theorem 3: Promote use of information in people's lives & communities. Community development & coordinating structures Motivate to learn through the mass and other media

Figure 1

KNOWLEDGE GENERATION, PRODUCTION, DISTRIBUTION, MAINTENANCE

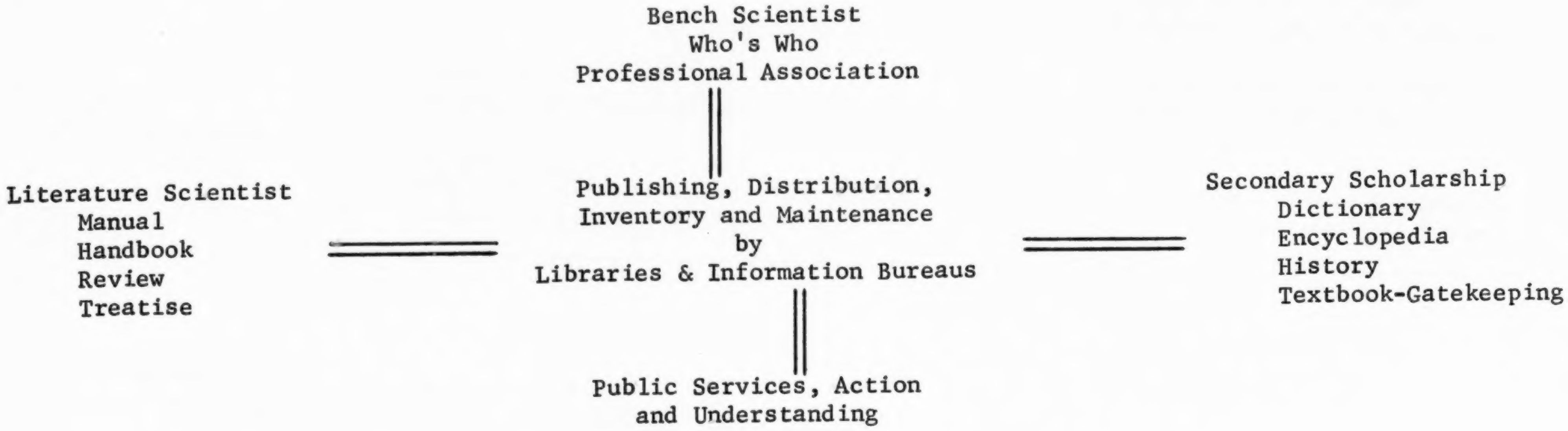
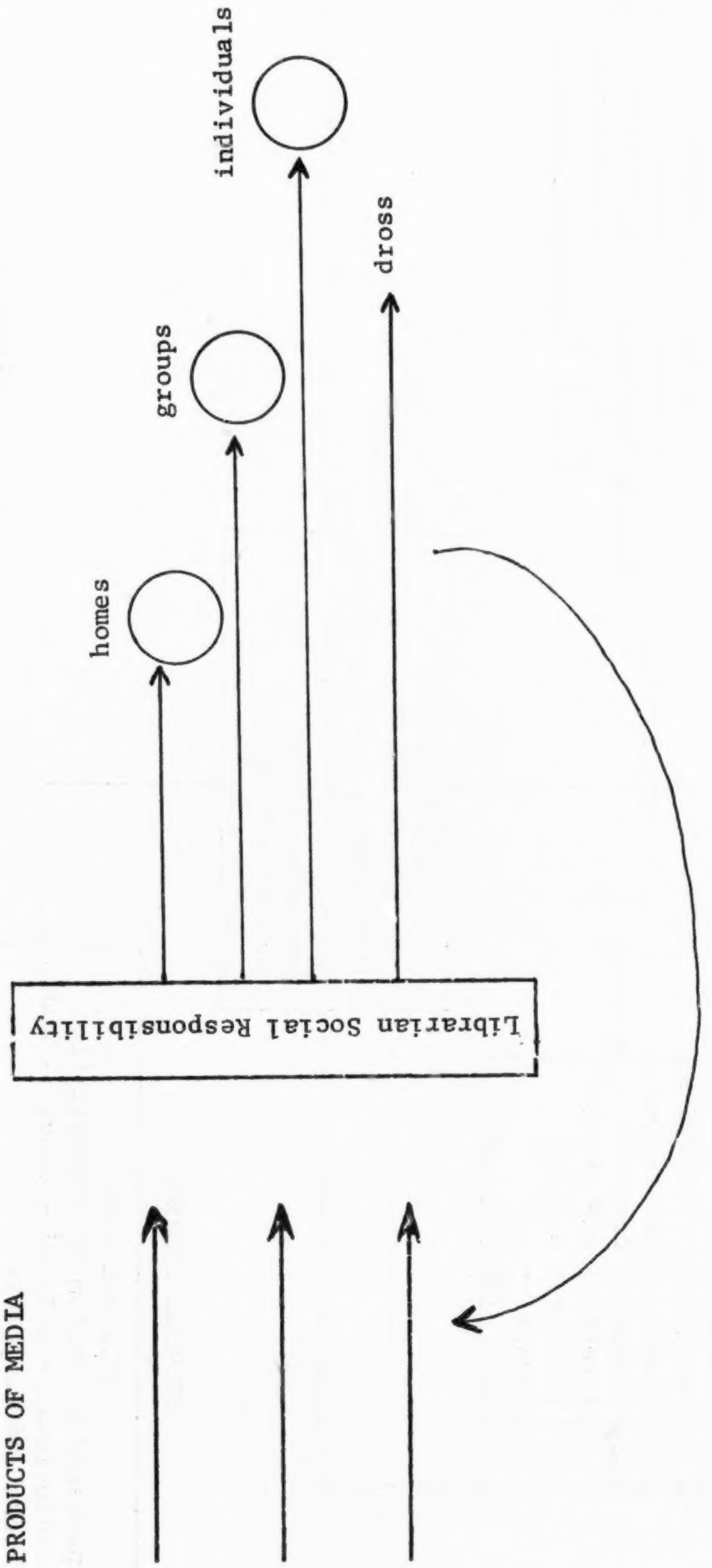

Bench Scientist
Who's Who
Professional Association
Literature Scientist
Manual
Handbook
Review
Treatise
Publishing, Distribution,
Inventory and Maintenance
by
Libraries & Information Bureaus
Secondary Scholarship
Dictionary
Encyclopedia
History
Textbook-Gatekeeping
Public Services, Action
and Understanding

Figure 2


PRODUCTS OF MEDIA
Librarian Social Responsibility
homes
groups
individuals
dross

Critic responsibility

Social responsibility

Change agent

Figure 3

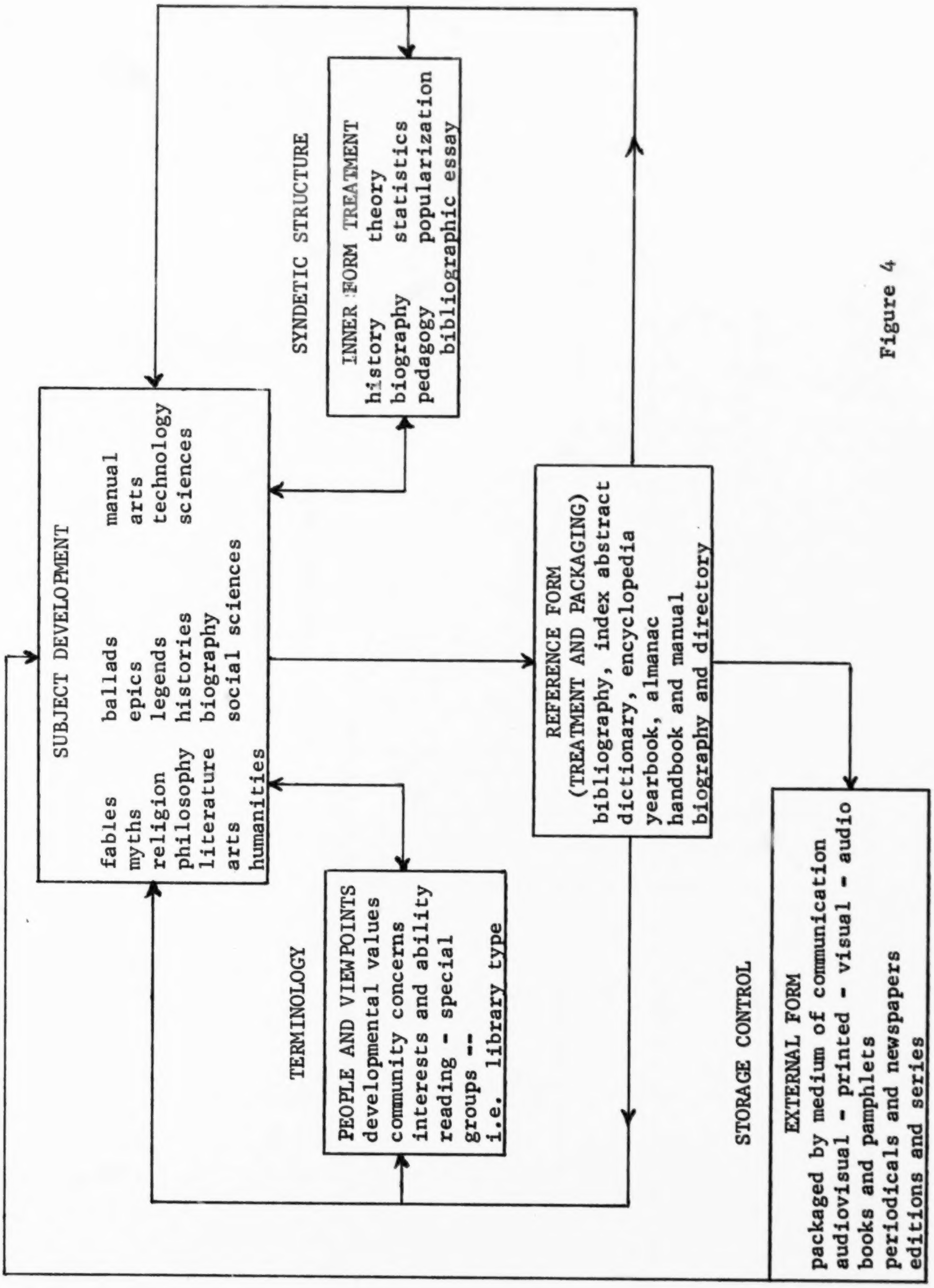

SUBJECT DEVELOPMENT
fables
myths
religion
philosophy
literature
arts
humanities
ballads
epics
legends
histories
biography
social sciences
manual
arts
technology
sciences
SYNDETIC STRUCTURE
INNER FORM TREATMENT
history
biography
pedagogy
theory
statistics
popularization
bibliographic essay
TERMINOLOGY
PEOPLE AND VIEWPOINTS
developmental values
community concerns
interests and ability
reading - special
groups --
i.e. library type
REFERENCE FORM
(TREATMENT AND PACKAGING)
bibliography, index abstract
dictionary, encyclopedia
yearbook, almanac
handbook and manual
biography and directory
STORAGE CONTROL
EXTERNAL FORM
packaged by medium of communication
audiovisual - printed - visual - audio
books and pamphlets
periodicals and newspapers
editions and series

Figure 4

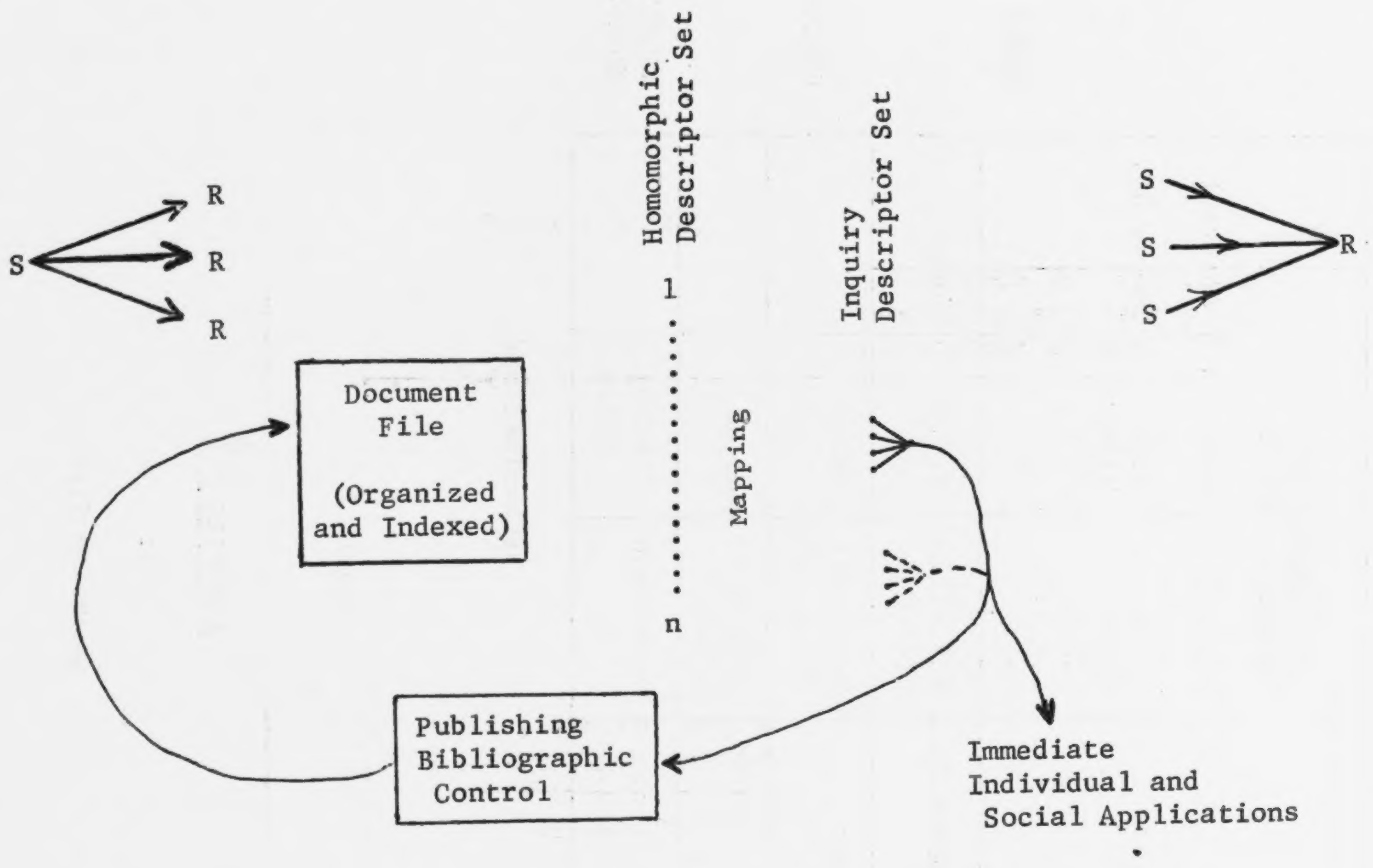

S
R
R
R
Homomorphic Descriptor Set
1
n
Mapping
Inquiry Descriptor Set
S
S
S
R
Document File
(Organized and Indexed)
Publishing Bibliographic Control
Immediate Individual and Social Applications

Figure 5

OUTLINE

BACKGROUND

GUIDES

Bibliographical Control System

	bibliog	index	abstract
inventory	C.B.I. Ayers E.M.I. P.A.I.S. Gov't	S.S. Wilson	Chem. Ab.
evaluative	V.K.&L.J. Std. Cat.	B.R.D.	Annot.
holdings	Union cat. Union list	Ash	
subject guide	Asheim Coman		
bibliog. of bibliog.	Besterman	Bibliog. Index	

TERMS

RECENT INFO.

FUGITIVE INFO.

NAMES

PLACES

AGENCY & ORGANIZ.

COMMUNITY RESOURCES

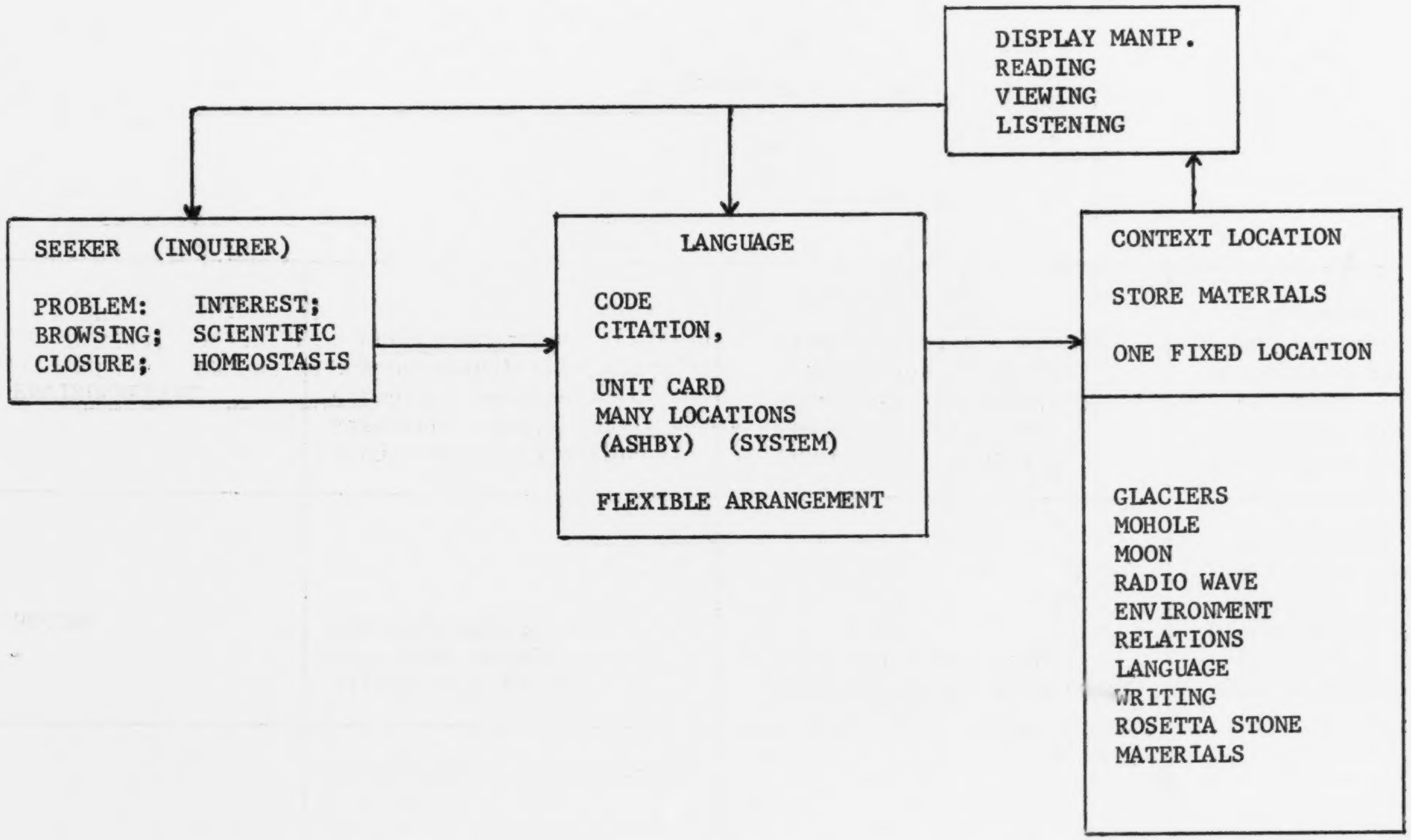
ILLUSTRATIONS.

Figure 6

AIM FIRE !

at

Question Types



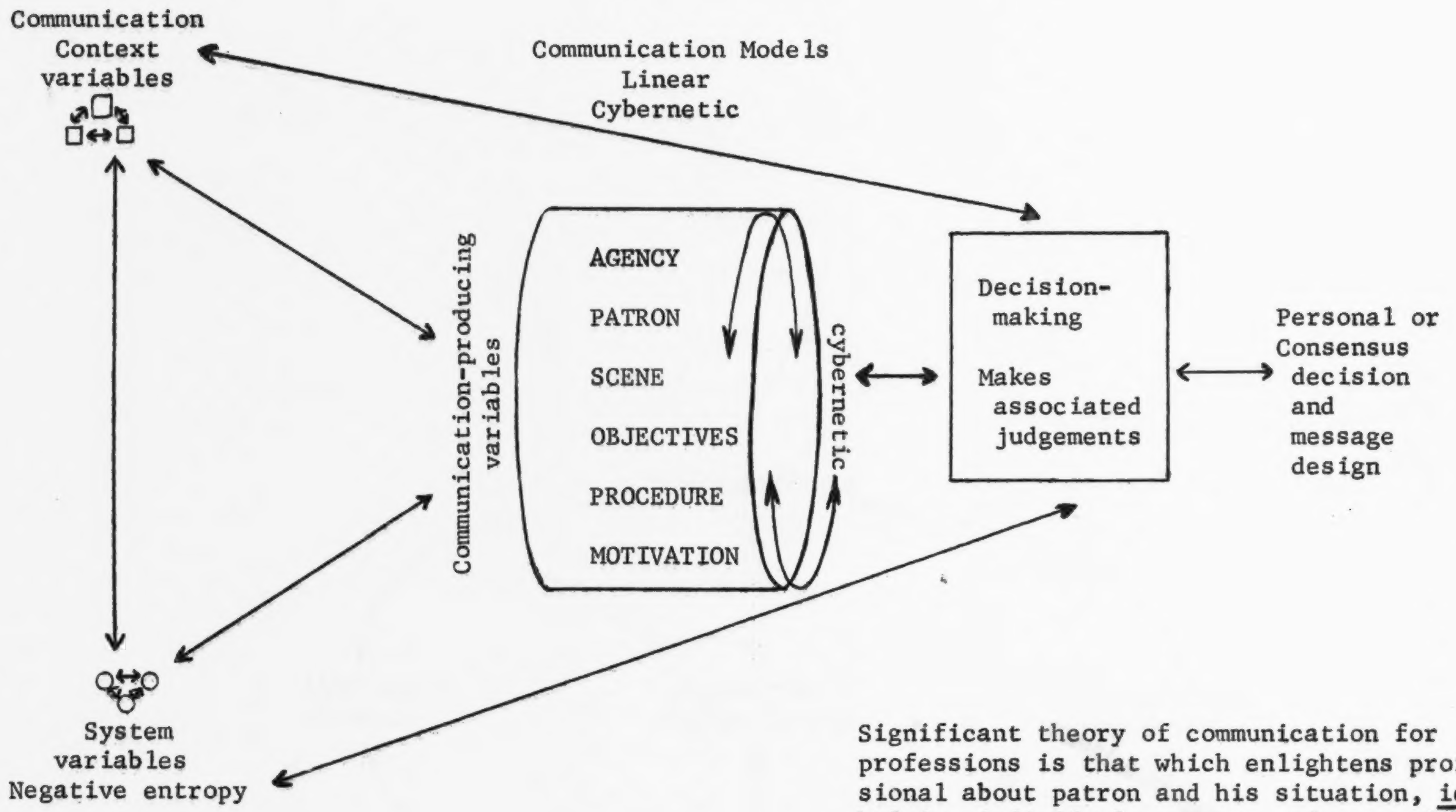
DISPLAY MANIP.
READING
VIEWING
LISTENING
SEEKER (INQUIRER)
PROBLEM: INTEREST;
BROWSING; SCIENTIFIC
CLOSURE; HOMEOSTASIS
LANGUAGE
CODE
CITATION,
UNIT CARD
MANY LOCATIONS
(ASHBY) (SYSTEM)
FLEXIBLE ARRANGEMENT
CONTEXT LOCATION
STORE MATERIALS
ONE FIXED LOCATION
GLACIERS
MOHOLE
MOON
RADIO WAVE
ENVIRONMENT
RELATIONS
LANGUAGE
WRITING
ROSETTA STONE
MATERIALS

Figure 7

Information System Model

Entropy-reducing Systems	DYAD	GROUP	COMMUNITY
PERSONAL	Motivate to communicate. Thinking, cognition, inference. Skills of liberal education. Counseling & consultation.	Motivate to participate. Group sensitivity. Group learning.	Agency's knowledge to diffuse.
SOCIAL	Client peer group. Reference groups. "Talking chains".	Administrative situations. Organizational scene.	Agency purpose & policy. Coordinating Community council. Cybernetic community development.
ENVIRONMENTAL	Create new knowledge. Research, publishing. Primary & secondary scholarship for "world encyclopedia".	University faculties. Subject disciplines. Scientific & Technical societies. Professional societies.	Language & culture. Knowledge storage & control. Networks & systems for information control & transfer.

Figure 8


Communication
Context
variables
Communication Models
Linear
Cybernetic
Communication-producing
variables
AGENCY
PATRON
SCENE
OBJECTIVES
PROCEDURE
MOTIVATION
cybernetic
Decision-
making
Makes
associated
judgements
Personal or
Consensus
decision
and
message
design
System
variables
Negative entropy

Significant theory of communication for professions is that which enlightens professional about patron and his situation, ie. helping individuals, groups and communities with symbol development and information problems when their motivation, or ability, or knowledge is not sufficient.

Figure 9
MODELS OF COMMUNICATION

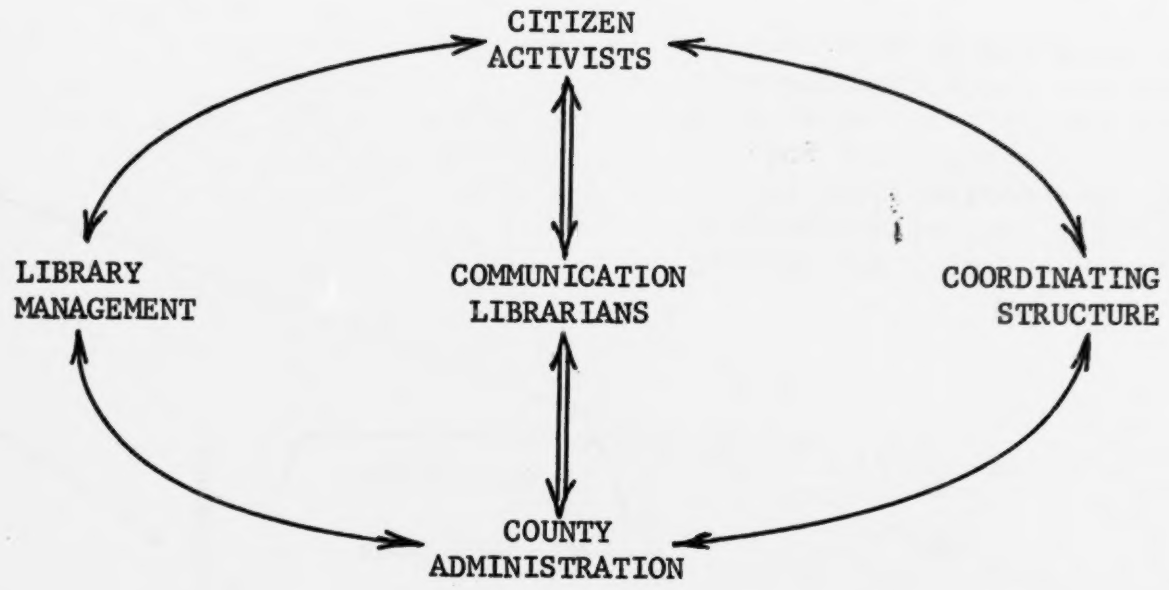

CITIZEN ACTIVISTS
LIBRARY MANAGEMENT
COMMUNICATION LIBRARIANS
COORDINATING STRUCTURE
COUNTY ADMINISTRATION

Figure 10

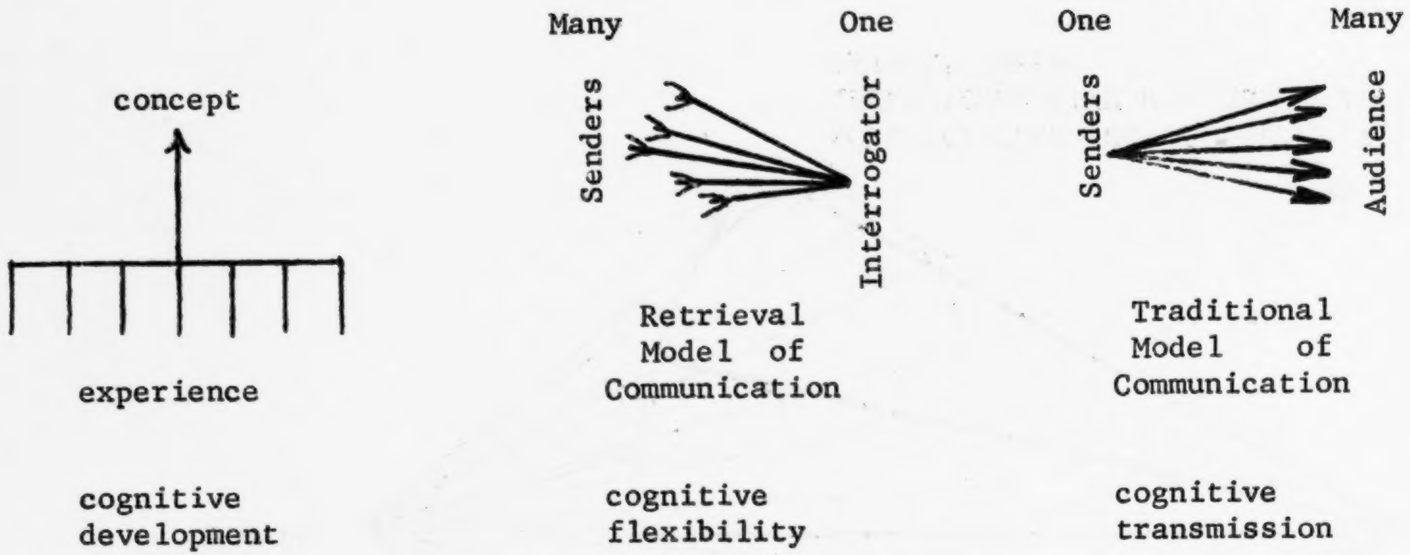

concept
experience
cognitive development
Many
One
Senders
Interrogator
Retrieval Model of Communication
cognitive flexibility
One
Many
Senders
Audience
Traditional Model of Communication
cognitive transmission

Figure 11

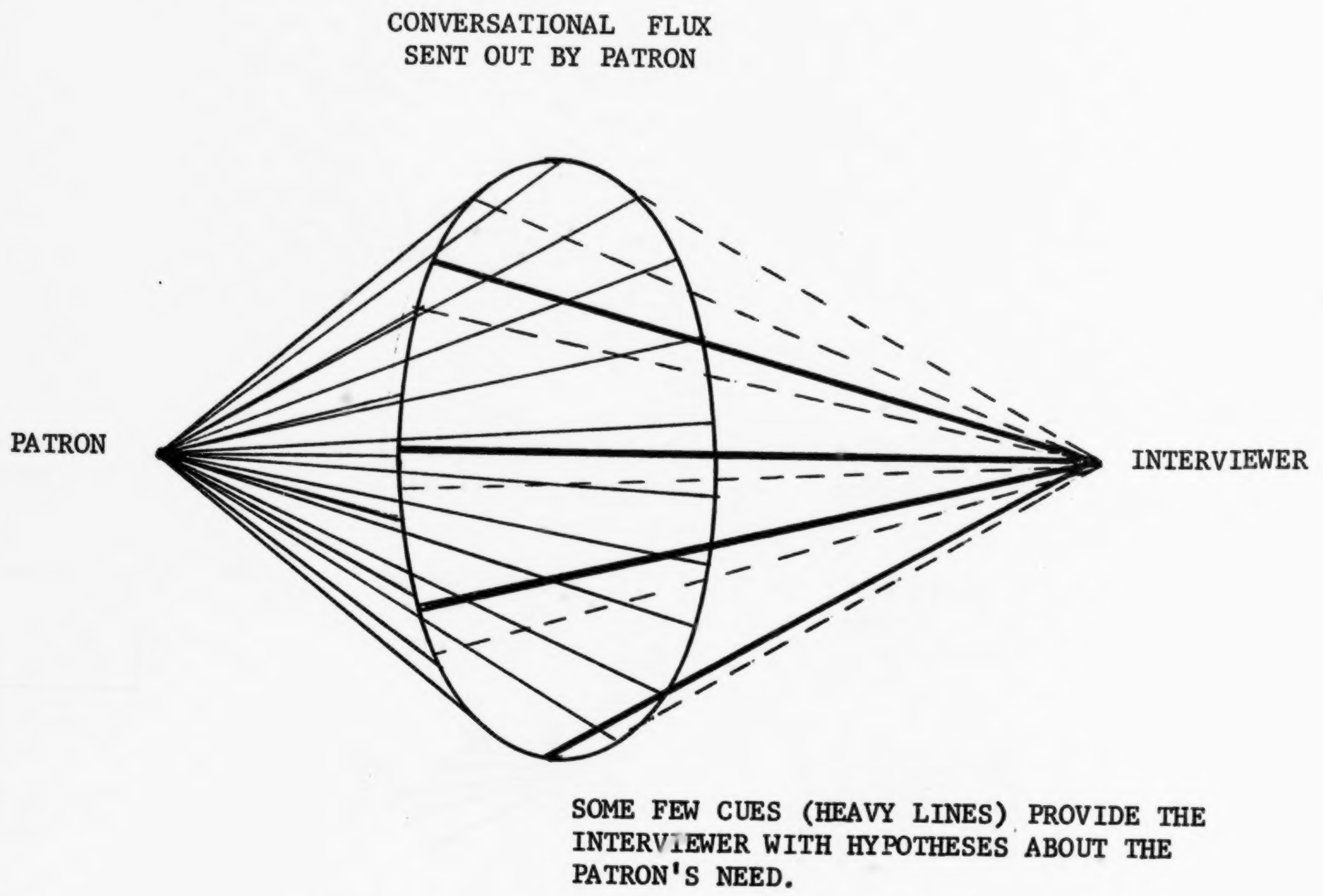

CONVERSATIONAL FLUX
SENT OUT BY PATRON
PATRON
INTERVIEWER
SOME FEW CUES (HEAVY LINES) PROVIDE THE
INTERVIEWER WITH HYPOTHESES ABOUT THE
PATRON'S NEED.

Figure 12

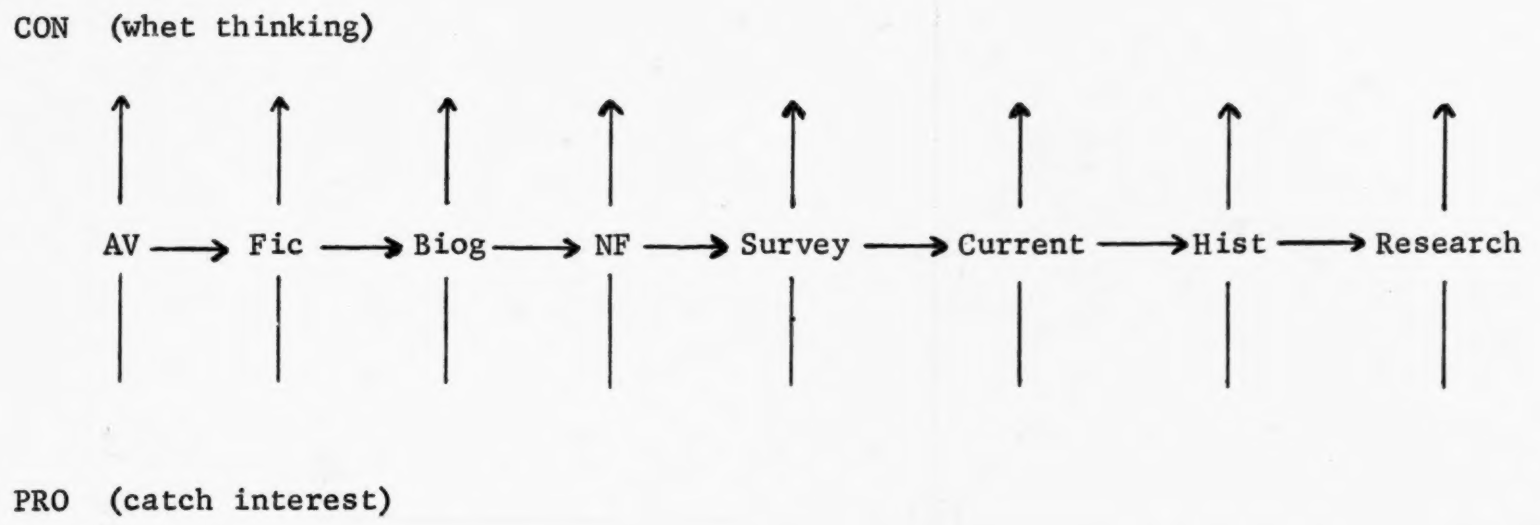

CON (whet thinking)
AV
Fic
Biog
NF
Survey
Current
Hist
Research
PRO (catch interest)

Figure 13

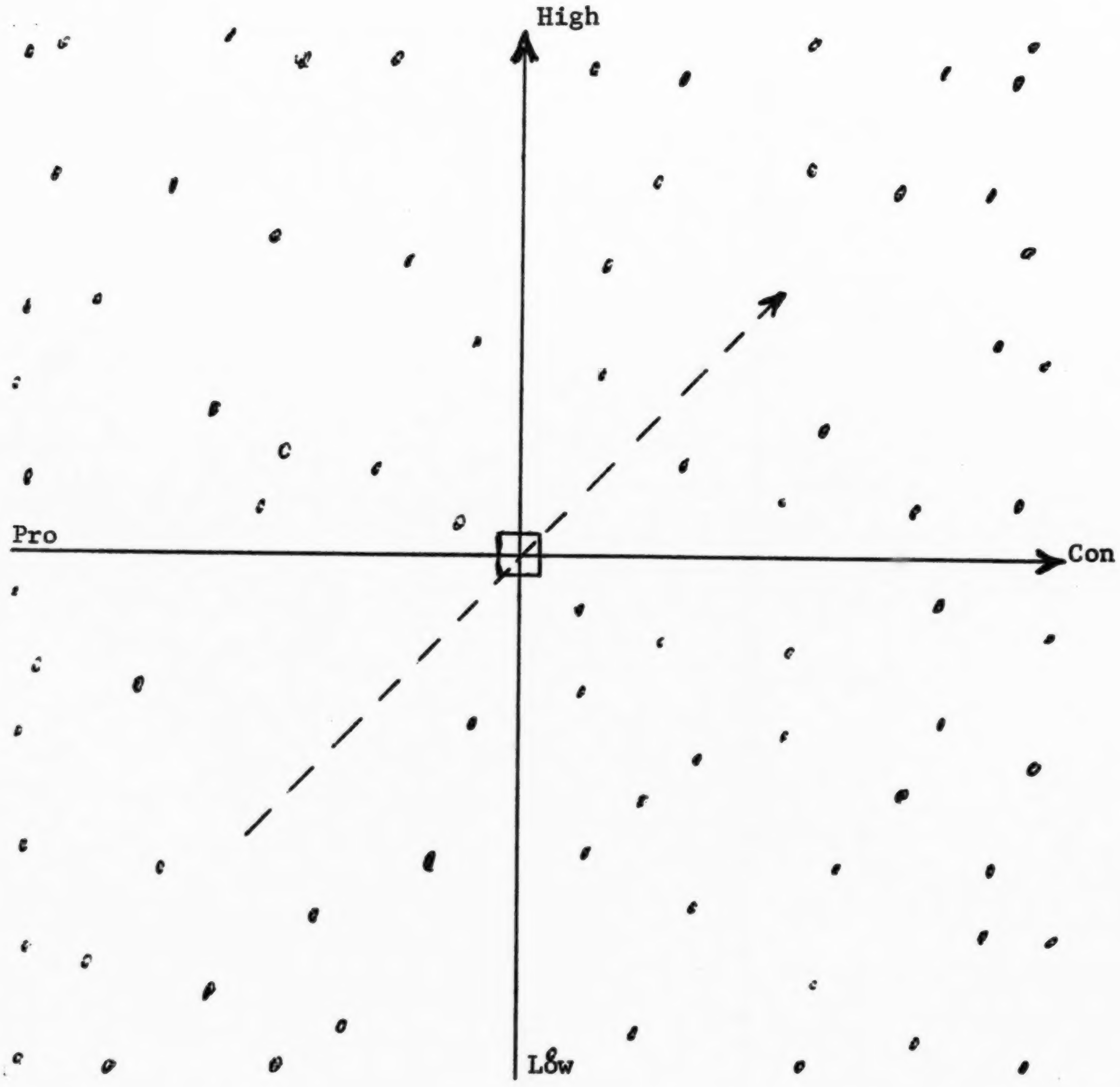

High
Pro
Con
Low

Figure 14

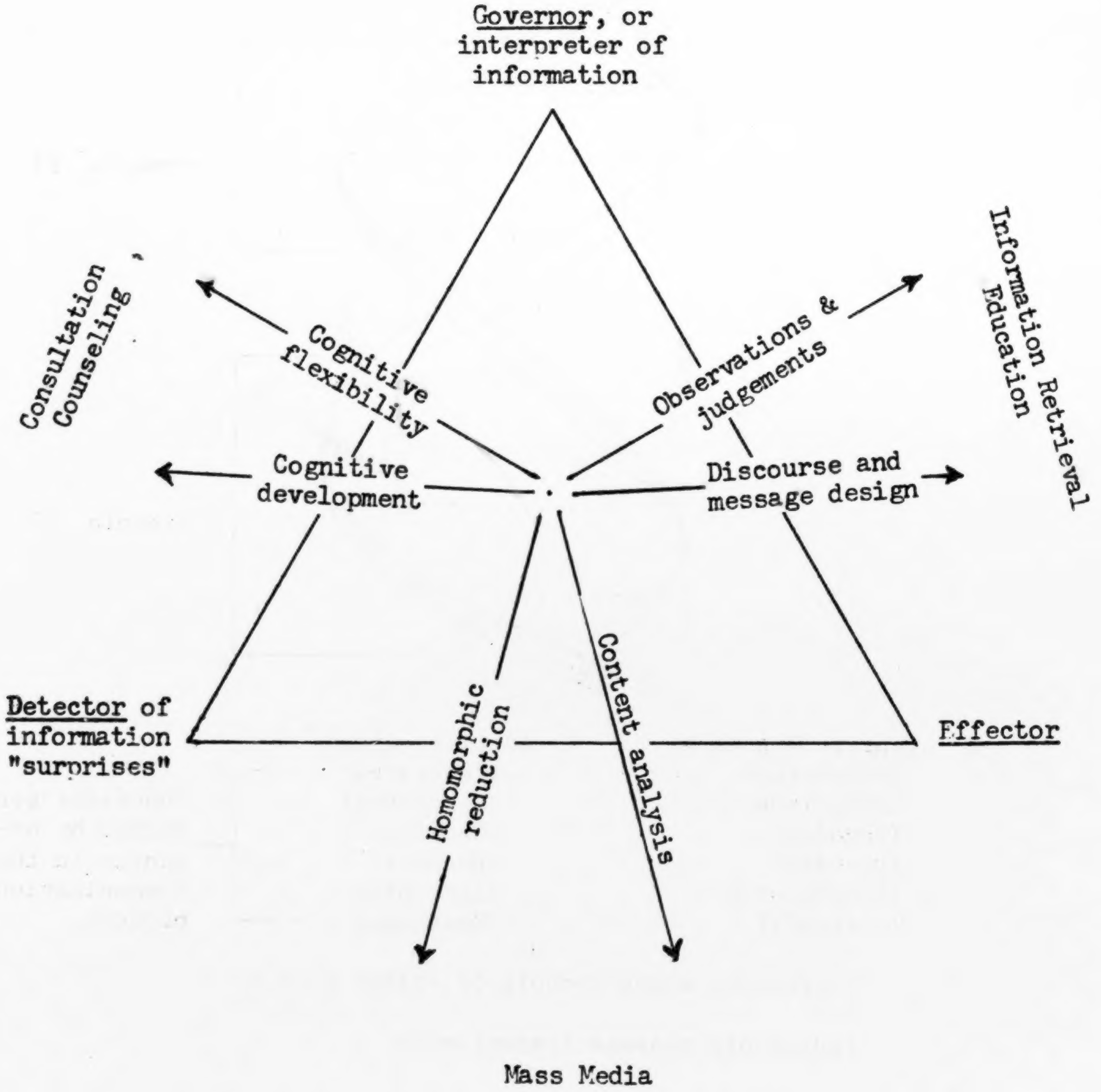
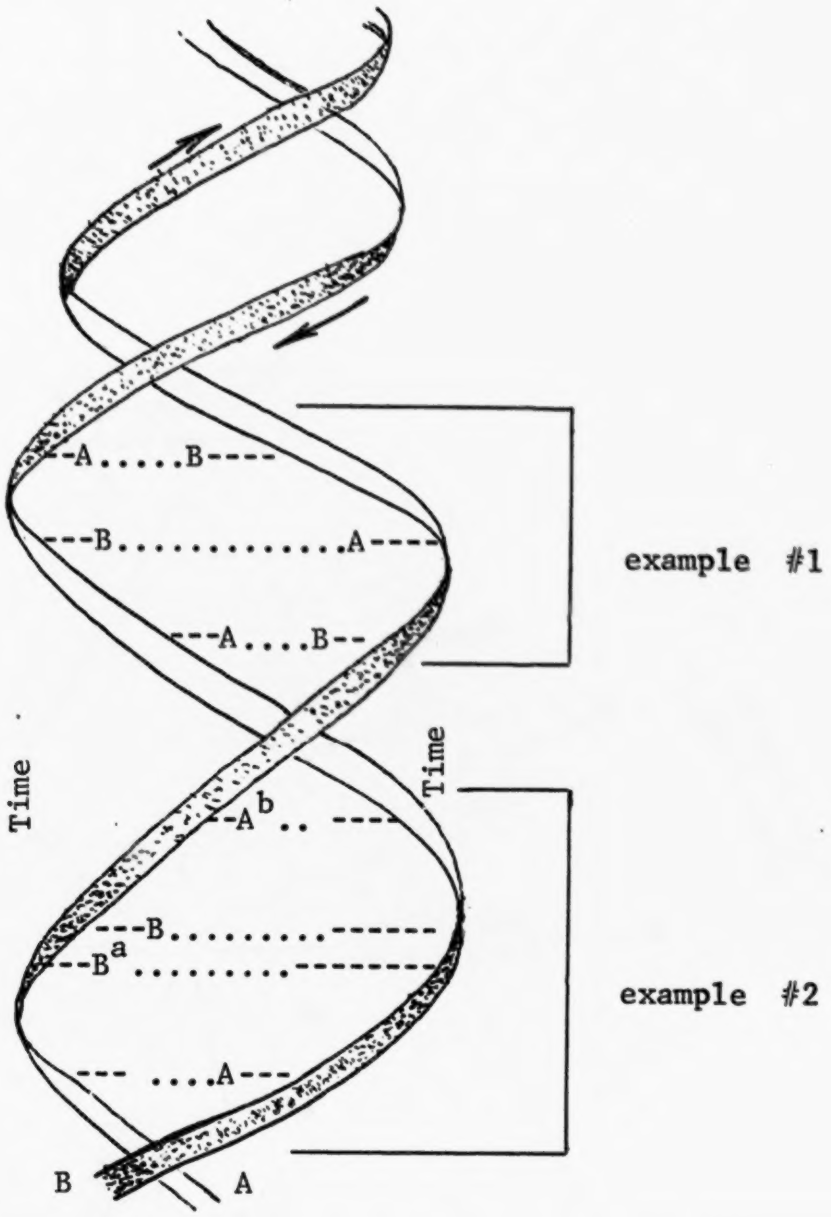

Governor, or interpreter of information
Information Retrieval
Education
Consultation
Counseling
Cognitive flexibility
Observations & judgements
Cognitive development
Discourse and message design
Detector of information "surprises"
Homomorphic reduction
Content analysis
Effector
Mass Media

Figure 15



B Adaptive Organism
(Generates)
(Perceives)
(Encodes)
(Decodes)
(Interprets)
(Responds)

A Adaptive Organism
(Generates)
(Perceives)
(Encodes)
(Decodes)
(Interprets)
(Responds)

Functions performed by organism in the communication process.

----- represents signs/symbols of either A or B

..... represents message transmission

B^a represents signs/symbols of B in response to A

A^b represents signs/symbols of A in response to B

Figure 16

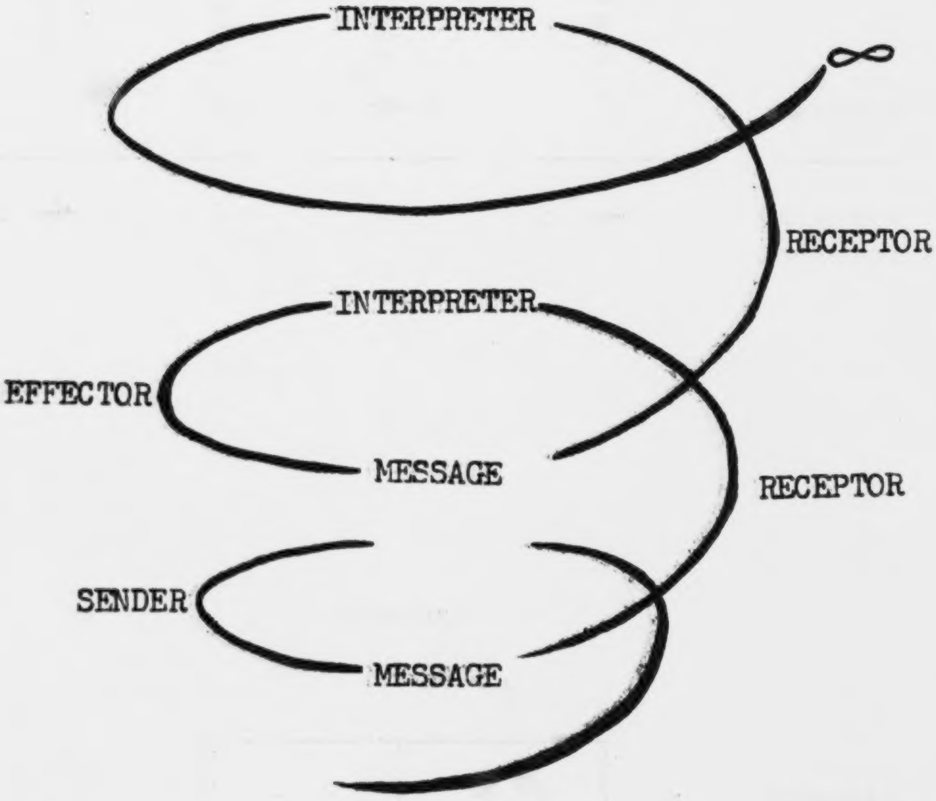

INTERPRETER
∞
RECEPTOR
INTERPRETER
EFFECTOR
MESSAGE
RECEPTOR
SENDER
MESSAGE

Figure 17

EPISTEMOLOGICAL CONSIDERATIONS

	realist	idealist	homeostasis	cognitive development	cognitive flexibility
concept	0	1 → n	1	1	1 → n
visceral referent	1 → n	0	1	1 ← n	1

		Concept	
		+	-
visceral referent	+	+ +	+ -
	-	- +	- -

Cells one and four indicate equilibrium or homeostasis in either conceptual or visceral states.

Cells two and three indicate that "thinking" needs further development, and have greatest potential for change. They are instability cells with potential movement in the direction and degree of change towards other cells.

Figure 18

HERMENEUTIC CONSIDERATIONS

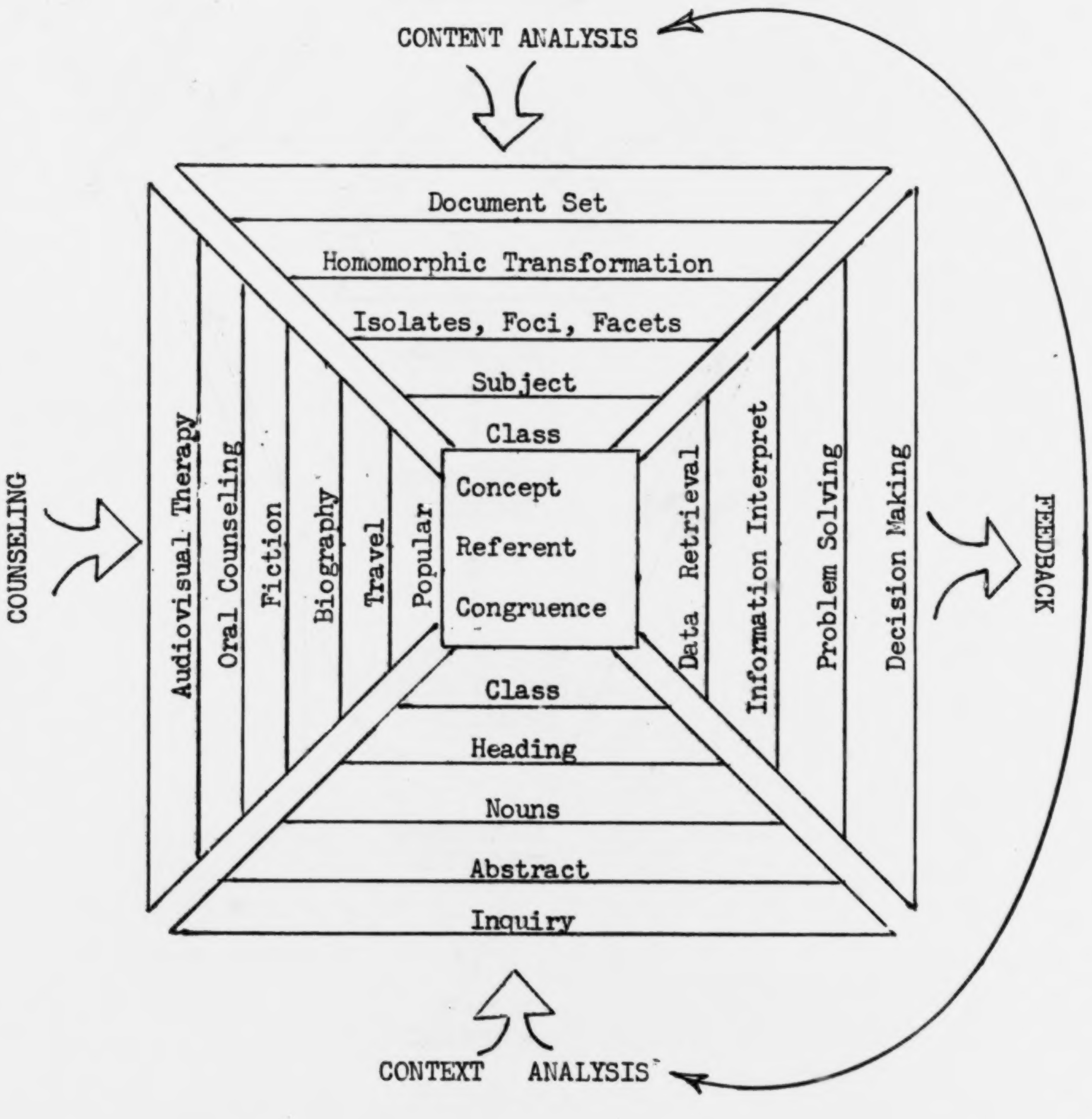

CONTENT ANALYSIS
Document Set
Homomorphic Transformation
Isolates, Foci, Facets
Subject
Class
Concept
Referent
Congruence
Class
Heading
Nouns
Abstract
Inquiry
CONTEXT ANALYSIS
COUNSELING
Audiovisual Therapy
Oral Counseling
Fiction
Biography
Travel
Popular
Data Retrieval
Information Interpret
Problem Solving
Decision Making
FEEDBACK

Figure 19

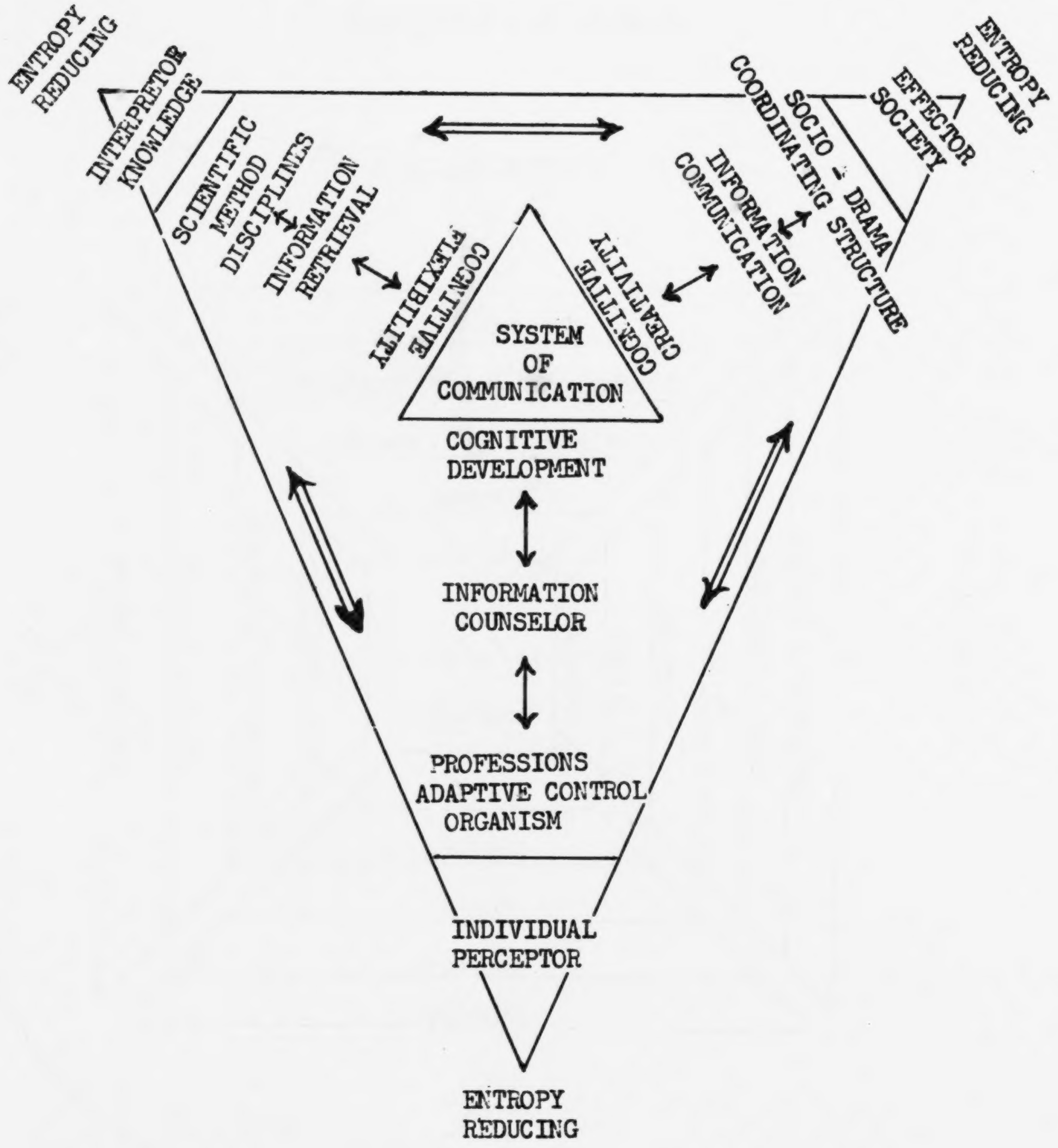

ENTROPY REDUCING
INTERPRETOR KNOWLEDGE
SCIENTIFIC METHOD DISCIPLINES
INFORMATION RETRIEVAL
COGNITIVE FLEXIBILITY
ENTROPY REDUCING
EFFECTOR SOCIETY
SOCIO - DRAMA COORDINATING STRUCTURE
INFORMATION COMMUNICATION
COGNITIVE CREATIVITY
SYSTEM OF COMMUNICATION
COGNITIVE DEVELOPMENT
INFORMATION COUNSELOR
PROFESSIONS ADAPTIVE CONTROL ORGANISM
INDIVIDUAL PERCEPTOR
ENTROPY REDUCING

Figure 20

GENERAL COMMUNICATIONS MODEL

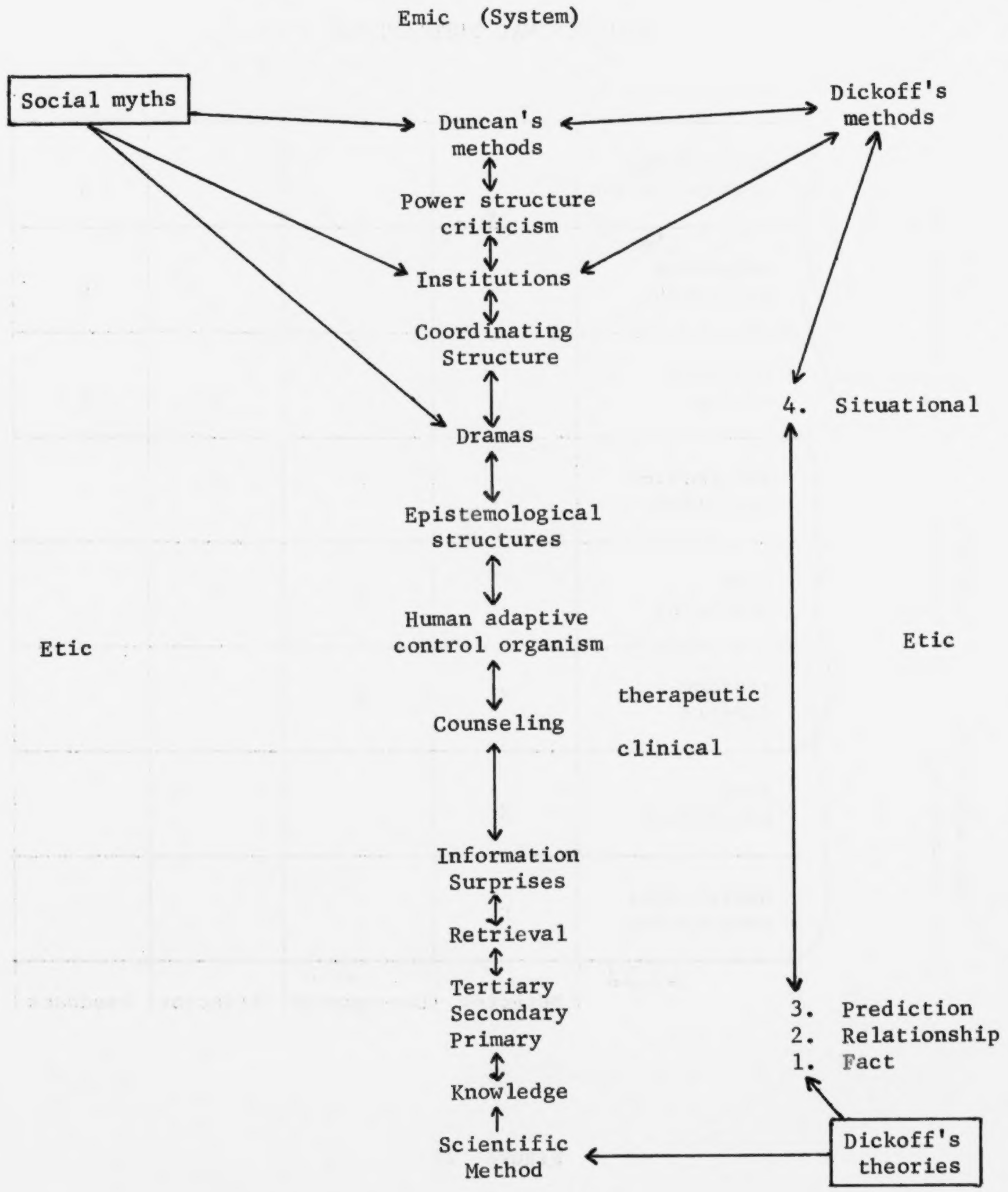

Emic (System)
Social myths
Duncan's methods
Dickoff's methods
Power structure criticism
Institutions
Coordinating Structure
Dramas
4. Situational
Epistemological structures
Human adaptive control organism
Etic
Etic
therapeutic
Counseling
clinical
Information Surprises
Retrieval
Tertiary
Secondary
Primary
3. Prediction
2. Relationship
1. Fact
Knowledge
Scientific Method
Dickoff's theories

Figure 21

DYAD NOMINAL DISTRIBUTION

		Detector	Interpretor	Effector	Feedback
Source manipulation	evaluation, interpretation				X
	ombudsman follow-up				X
	decision making			X	X
Advisory services	information assistance		X	X	
	data retrieval		X	X	
Developmental counseling	reading ladders	X	X		
	oral counseling	X			
	audiovisual composition	X			

Figure 22

GROUP NOMINAL DISTRIBUTION

	Detector	Interpretor	Effector	Feedback
Program planning				X
Leadership development				X
Action agenda			X	
Staff learning			X	
Interaction analysis		X		
Communication vs. control		X		
Situation - abstraction	X			
Visceral - abstraction	X			

Figure 23

COMMUNITY NOMINAL DISTRIBUTION

	Detector	Interpretor	Effector	Feedback
Advocacy				X
Organization Programs				X
Agency Programs				X
Coordinating Structure			X	
Community Development			X	
Information Referral			X	
Libraries		X		
Education		X		
Mass Communication	X	X		
Social Rules	X			
Language	X			

Figure 24

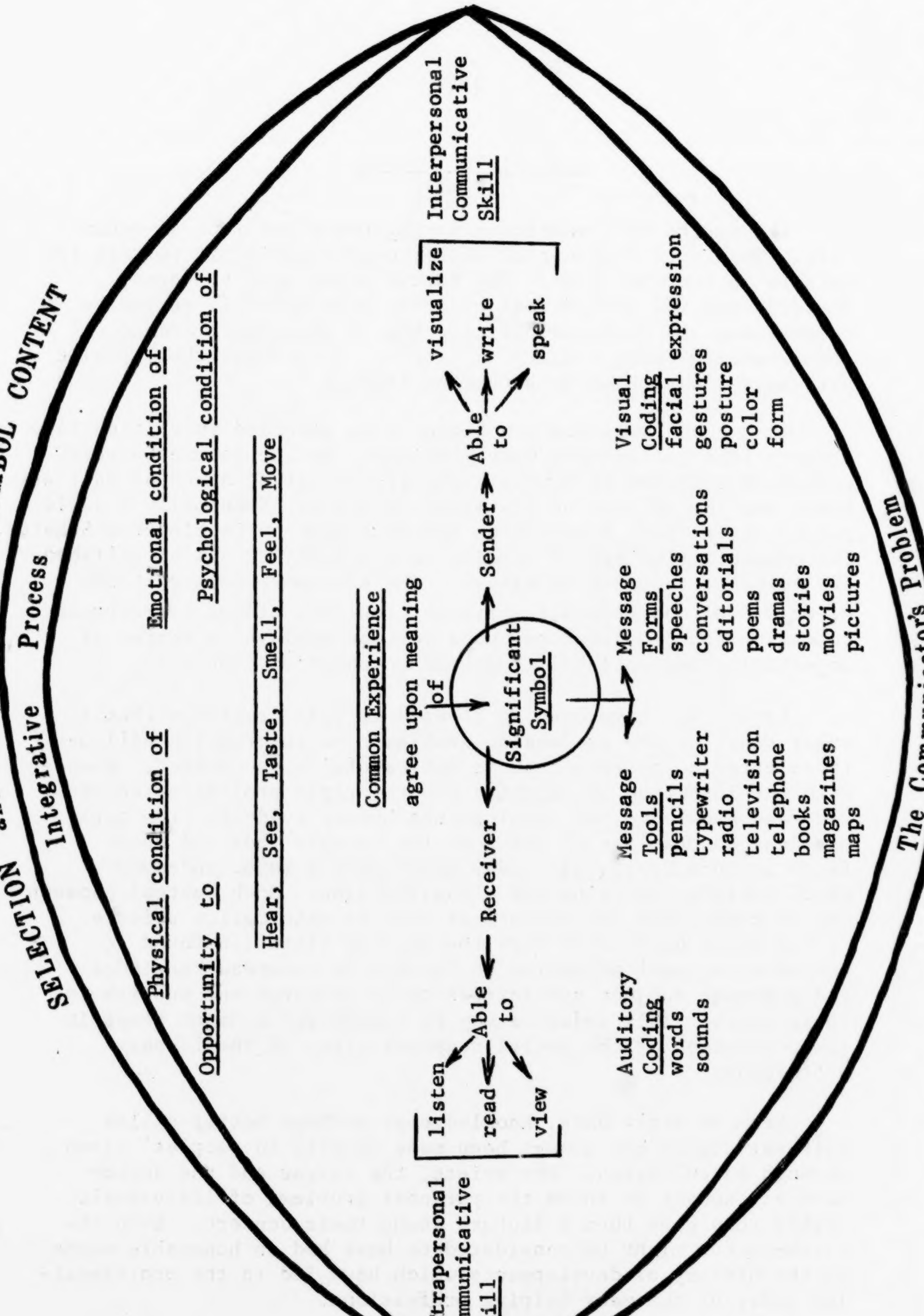

SELECTION and EVALUATION of SYMBOL CONTENT
Integrative Process
Physical condition of
Emotional condition of
Psychological condition of
Opportunity to
Hear, See, Taste, Smell, Feel, Move
Common Experience
agree upon meaning of
Intrapersonal Communicative Skill
listen
read
view
Able to
Receiver
Significant Symbol
Sender
Able to
visualize
write
speak
Interpersonal Communicative Skill
Auditory Coding
words
sounds
Message Tools
pencils
typewriter
radio
television
telephone
books
magazines
maps
Message Forms
speeches
conversations
editorials
poems
dramas
stories
movies
pictures
Visual Coding
facial expression
gestures
posture
color
form
The Communicator's Problem

Figure 25

SUMMARY POSTSCRIPT

The desire to communicate is the pervasive fact of social life. In a very fundamental sense, communication is culture and culture is communication. The public buildings, the arts, rhetoric and the sociodramas of civic life have all served to communicate the cultural heritage and to engender a common understanding among a group of people. In a sense these public arts have always been mass communication.

When oral communication began to be recorded in written form library-like collections were possible. As the documents were collected and grew in number, scholarship was advanced as well as logic and the methods of sustained thinking. Eventually a solid psychological base for reading was developed by Cassiodorus Senator. The communicative art of reading laid a base for and established the value of recorded knowledge. The extemporaneous rhetoric of whimsical and persuasive orators could be offset by recorded communication. Documentary codification achieved a degree of objectivity and reliability not to be obtained otherwise.

Librarians have been so steeped in this tradition that a major tenet of the profession remains: no information will be transferred to patrons that is not carefully documented. However with the invention of printing and the rapid proliferation of recorded knowledge two developments became evident. The early marginal annotations of texts as for example those of Roger Bacon on Duns Scotus has today grown into a major endeavor which includes indexing and classification. Such textual glosses may be considered the historical root of information science. On the other hand, John Dury the English librarian found it necessary to call attention to lacunae in recorded knowledge and persuade subject specialists to do research and publish in these areas. This endeavor may be considered a major tenet in the foundation of the social responsibility of the library profession.

From an early date, knowledge or perhaps better called cultural wisdom has always been made kinetic in peoples' lives through consultation. The priest, the lawyer and the doctor have all sought to solve the personal problems of individuals rather than give them a lecture about their concern. Even the witch-doctor might be considered to have had an honorable niche in the history of developments which have led to the proliferation today of the many helping professions.

Education of youth has always been a major method of communication but it was not until the Renaissance that any serious economic penalty became the misfortune of the illiterate. Continuing education and reeducation is of course a relatively recent phenomena which has continued to grow in prevalence during the last two centuries. Even today the concept of learning how to learn continuously is not widely practiced and remains an area of underdeveloped concern especially for school librarians in their instructional programs.

The study of communication has historically been preoccupied with the model of Aristotle. This preoccupation continued throughout and beyond the industrial revolution and the revolutionary sociopolitical transformations of the modern world. It was not until after the cataclysmic changes of the world wars and the biological and electronic revolutions that new models of communication were developed. The adaptive control organisms and mechanisms of biology and electronics led to the cybernetic model. The social spectacles of widespread immigration and the rapid emergence of new nations has led to the sociodrama model of communication and a concomitant theory for professions.

The impetus for a unified field theory around mid-century has resulted in the widespread endeavor for an all-encompassing systems theory of knowledge and the social order. Major syntheses have been proposed and interdisciplinary movements have led to systems transformations of knowledge especially in reshaping the social sciences. Cybernetics is rapidly emerging as the integrative discipline and as the science of control for men and machines. Communicative endeavor is being related to the entropy-reducing purposes which can be achieved in the major contexts of dyad, group and community, i.e. meet the needs of people for communicated information surprises.

The traditional study of epistemology has been transformed as has also been the case with logic. Epistemology is based on a concept of social science man and his adaptive control functions of self-preservation and self-gratification. Bionics and the study of automata have largely replaced traditional epistemology as the science(s) of man and machines. Variables in adaptive control organisms and mechanisms have been quantified and serious research can now be undertaken in the flow of information for communication purposes.

The library and information profession has scarcely been able to recognize, let alone cope with such revolutionary transformations. The systems concept is under development especially in network configurations but has barely received a sociopolitical rationalization and still remains unrelated to the sociodrama model of communication. Information science has only recently identified and studied a few problems that appear to be related to the field of isomorphic and homomorphic transformations of knowledge. Even though the concept of a world encyclopedia seems to be gaining momentum, such inquiry has not moved much beyond the traditional librarians' method of encouraging reductive and compendia writing.

The social responsibility of the librarian remains vague and appears to be conceived as the proliferation of service programs for various publics administered by independent and duplicative types of library. Little work is evident which realizes the objectives which John Dury had for the profession. Current inquiry which is being made into the nature of communication and epistemology still appears to be guided by traditional models and without much evidence of any acquaintance with cybernetics and bionics.

There may be a temptation to "fold ones' hands" and intone the demise of the library and information profession as a serious intellectural endeavor. But as in the 11-13th centuries, which saw the rise of the European university, there is hope in the growth of a few truly graduate library and information schools. In one, or perhaps two of these schools where creative intellectual endeavor is being encouraged there is a possibility that theories and models of communication will be developed and researched. If so, the hopes which leaders in the profession have always had for it will be realized as a major integrative influence in the sociopolitical affairs of men.

Communication may be all things to all people. Most assuredly it is defined differently by most people. That somebody has something to say to someone else, however, appears to be the basic minimum in any definition of communication from as far back as Aristotle. Even today this description resembles what people think they do when they communicate: a person sends a message to someone for some purpose. The message could be a letter, a speech or a television program and Lasswell describes such communication as: "Who says what? in which channel? to whom? with what effect?" (122).

More perceptive individuals however realize that one rather significant element has been omitted from such a definition. If they cited the conversation as an example, they might point out that the message sender also has a function as listener to the effect of his message on the other person. Stated in rather a Jamesean turn of phrase it goes something like this: the sender receives and studies the effect of his own message upon his message receiver. In other words, he studies the effect of his message (content analysis) in order to know what to say next. The sender monitors each discourse segment of his total message transmission.

The recognition of a function of listener to the effect of his own message on another person has recently added a significant dimension to the study of communication. This awareness is of something different than the traditional concern for studying message effect on the receiver which is evident in Lasswell's formulation. An awareness of this new dimension in the function of communication is the basis for the cybernetic model of the communication process. Norbert Wiener's name is usually associated with the cybernetic model (26) because of his work in electronics and cybernetic mechanisms. But Cannon (25) must also be given recognition for his earlier contribution to the concept of an adaptive control organism which parallels the adaptive control mechanisms and automata of Wiener.

Consequently today there are two major models of communication--the linear and the cybernetic. In each model several theories of communication are embedded. The descriptive linear, or target-directed model of communication stretches from Aristotles' Rhetoric to Shannon (3). Even today new models of linear communication theory are being proposed. The cybernetic model of communication of Wiener and Cannon is based on an adaptive control organism (or mechanism, or system) and includes three essential components: a receptor, interpreter and effector. The receptor receives messages as information and interprets the information before responding or doing something as a consequence.

The question may occur in the minds of some as to the difference, except in name and reverse order of sequence between the sender, message, receiver of Aristotle and Shannon, and the receptor, interpretor, effector of Wiener and Cannon. The difference is readily visualized and significant. The sender in the traditional linear model is a rifleman who aims and hits, hopefully, a stationary target. In the cybernetic model, on the other hand, the target may move in any direction after the rifleman has fired his bullet. In order to hit a moving target, the sender must have a communications system that is cybernetic.

Another way to distinguish between linear and cybernetic communication is the difference between a model and a system. A model may be static, encompass cause-effect relations and possess two dimensions. But a system is usually four dimensional and dynamic. A model can be quite logical, whereas the "logic" of the system is always situational, transactional or parametic.

These elementary distinctions between a linear model and a cybernetic system are fundamental to a contemporary understanding of communication science. Based upon a cybernetic syste, communication can be all things to all people. In fact, Hall (73) has employed the Gestalt as the constituent element in his definition, "Communication is culture; and culture is communication." These distinctions are particularly important for library and information specialists. The librarian has usually been either a demure receiver of patron demands, or else overcompensates by trying to out-rhetoric Aristotle. Rarely is the librarian a cybernetic listener and programer. Not only has he tended to believe that meanings leaps out from the page at a single linear scan, but his services are traditional and essentially linear in communicative activity.

New principles of communication science are needed by library and information specialists in order to meet the demands for information control and transfer in community development and for the managerial revolution in social policy making endeavors. In any societal context, from the primitive to the highly complex modern civilizations, it has been hypothesized (74) (75) that four social methods of communication exist. Indeed, upon this hypothesis rests the situation producing profession of library and information science. Cybernetic communication shifts in emphasis from message design and transmission to the creation and management of communicative situations that involve both sender and receiver.

Communication is the study of knowledge diffusion as used to reduce entropy by individuals, groups and communities. Knowledge as such, once it is recorded, remains static until it is made kinetic through use. Scholarship or knowledge has in the past been communicated through four general societal methods as indicated by Butler (74) and Burke (75):

1. Education, includes adult continuing education whereby the common scholarship required by every citizen and especially those in specialized vocations are explicitly educated. Counseling is frequently used in the endeavor for promoting cognitive development and cognitive flexibility in every citizen.

2. Consultation includes a group of processes which are used by such learned professions as medicine, law and engineering. A sick person or one involved in a lawsuit, does not read a medical or legal treatise. Instead he consults a physician or lawyer to obtain the particular bits of professional scholarship applicable to his individual case. Community referral is an area of concern to librarians serving in community coordinating structures (i.e., libraries) as a method for making knowledge kinetic in the lives of people.

3. Mass communication makes it possible for every citizen to be continuously exposed to a rain of information concerning current happenings and to a hail of arguments or suggestions intended to confirm or alter individual convictions. Orchestration of media is a method which is essential in order to make it difficult for citizens to avoid thinking about important community issues.

4. Reference work is the method whereby the individual extracts the exact piece of scholarship needed at any moment from a group of related materials although the exact knowledge is explicitly contained in no one item. Finding and reading a single volume on a desired topic is but a truncated form of the complete reference process.

The profession of library and information science produces relevant communication situations in all four of the above areas. A situation-producing theory is the basis for communication science and its subset of principles known as information transfer. Lester Asheim made this clear several years ago in his analysis of library communication, the kinds of problems which the library is best fitted to study, two major approaches are probably most useful: content analysis and audience research" (93). Content analysis depends upon the collection and organization of information records. Audience research requires the continual analysis of community concerns and interests.

More recently, the conference on the "Intellectual Foundations of Library Education" identified several axioms and theorems of communication science for librarians and information specialists ( ). These principles are embedded in the two major models of communication, the linear or traditional model and the cybernetic system. The linear model has served both the information (document) transfer aspects of the profession as well as audience research. It was librarians like Wilson (81) and Waples (82) who pioneered in the social aspects of reading and information use. The volume on Adult Reading (250) presents and describes the role of the traditional librarian, in the best sense of the word, in the social endeavor whose aim is to make knowledge kinetic in the lives of people. In fact, Waples What Reading Does for People is an excellent synthesis of the principles of document transfer and audience analysis in terms of the traditional model of communication.

The study of communications is an essential component of the professions, the sciences and the humanities. It is a discipline with common problems and an intellectual endeavor centering around the study of symbols and statements, but particularly messages and systems in life and society. Were it not for the fact that messages can have objective existence communications science, as a science, might serve merely as the "theory" of a clearinghouse or market place of ideas. The message as the artifact (message design or discourse) is the protolocus for investigation while the analysis of content (content analysis) is the prototype of investigative procedures. Even a conversation is something made for communication purposes. Today with available recording equipment, the conversation can be quantified and objectified. The message in whatever form, is the only thing that can be quantified in the sense of dimension, sequence and channel capacity.

Statements and messages which are shared with other persons are the ways people have of thinking, knowing and relating to each other. The message, of course, must be expressed in order to exist independent of the adaptive control organism or mechanism. Creating and sharing in reciprocal intentions through the use of symbols and statements is the process whereby men become human (2), and Shera has frequently made a case for the function of recorded knowledge as a social epistemology (76).

Any change in the process of information stimuli and in the negotiation of mutual intentions alters both the individual personality and the nature of human society. Society is today in the midst of revolutionary transformations. Communications science consequently has had to encounter major change both in technology and in the societal bases of symbol production and use. New media alter form, content and context (187). New modes of communication change ways of selecting, composing and sharing messages and perspectives. The message and the medium tend to become reciprocal as Marshall McLuhan has dramaticized so remarkably (251).

The new social bases of message design and usage have meant a revolution in the exploitation of information and in popular culture. Information has become a social resource to be exploited for the betterment of all men. The institutions of communication have created publics and have cultivated common tastes across boundaries of time, space, status and culture (252). New patterns of information flow stimulate social development and machine control, and cybernetically shape the referential terms of our negotiations with one another and the real world (46) (253).

The emerging information systems and networks employ communication specialists that exert information leadership in the transformations of sociopolitical and economic institutions which are underway and the revolutionary changes in managerial functions. Organizations, public and private, are being managed less by lawyers and financiers and more by the emerging profession of decision-makers and problem-solvers who can handle large amounts of information about quite different issues and subjects (66). Such communications specialists move from issue to issue, and indeed from public to private sector, demonstrating competence to focus the immense volume of general and specialized knowledge for organizational decision-making.

Rapid change and development expose old problems of communication to new scrutiny as well as raise new problems. How does a story, a message, a symbol evoke or elicit response, unite and divide, bind and release? How do the disciplines and professions process, transmit and integrate information into given frameworks of knowledge? Communications specialists used to handle these "older" problems somewhat successfully using as a guide the traditional model of communication whose embedded theories stretch from Aristotle's Rhetoric to Shannon and beyond.

But new questions have emerged which are difficult to analyze with a linear model of communication. How do societies produce symbol systems and muster their technologies to sustain them? How are the issues and choices inherent in the systems assigned value and weight? What guidelines can be employed to measure and test communication policies and design in changing cultures, and indeed for that matter in the changing personalities of an individual? For the analysis of questions such as these, the cybernetic model of communication has proved helpful. There are a number of theories embedded in the cybernetic model, but those of Wiener (26), Duncan (2) and Dickoff (1) are particularly pertinent to human communication and information transfer.

Communication is the continuous, pervasive and comprehensive collectivity of all mechanisms and organisms as well as the physical universe. The range of information which can be a message to an organism is enormous compared to a machine where the information usable by a mechanism has to be programed. Message content must be perceived, analyzed for information and intentions before the organism reciprocates with an interchange, or exchange of message design. Anything that can be perceived can be a message. The message may be a sensation, a gesture, a sound or a word. Upon perception, the message becomes kinetic but the information (in the Shannon sense) remains mere surprise until it is interpreted. The message *per se* remains inert, though its entropy or range of freedom can be measured, until it is perceived and made kinetic through interpretation by an adaptive control mechanism or organism. Interpretation leads to further communication and a new message is created.

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